The Radio and the Internet

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I. INTRODUCTION

During the summer of 2007, a brawl erupted at the Federal Communications Commission (FCC) and in Congress over what rules should apply to an auction of licenses to use a narrow swath of electromagnetic spectrum. The auction, which took place in January 2008, allocated commercial wireless licenses for spectrum in the 700 MHz band that is being vacated as a result of the nation's transition to digital television. This spectrum was considered highly valuable "beachfront property" because it allows for the transmission of signals through objects and over long distances (and thus requires a fraction of the number of cellular towers that are necessary for the use of higher frequencies). Indeed, because the auction was likely to reap $20 billion in revenue for the U.S. Treasury, congressional interest was high. All of the current players in the communications industry were involved in the fight, making strong arguments about the conditions under which this spectrum should be licensed. The size of the spectrum licenses (local, regional, or national?), the business model of the licensee (wholesale, open access or retail, discriminatory access?), and the obligations of the licensee to public safety officials (build a network for public safety, or make some services available at a low price?) were subjects of extensive commentary.

Reports about this auction (the "700 MHz auction"), which was probably the last competitive auction for a substantial amount of spectrum for the next few decades,[1] prompted a vigorous debate in the press and the blogosphere about the goals and expectations of U.S. communications policy. Opponents of license conditions typically focused on the revenue to be gathered through the auction, and argued that any limitation on what could be done by licensees would diminish the market value of these li-

1. At the open Commission meeting during which the 700 MHz auction rules were announced, Commissioner McDowell described the proceeding as the "auction of the century." *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, 22 F.C.C.R. 15289, 15571 (Aug. 10, 2007) (second report and order) [hereinafter Second Report and Order] (statement of Commissioner Robert M. McDowell, dissenting in part). The 700 MHz auction took place because digital television was forcing the release of spectrum; no other large auctions of spectrum are currently planned. *See generally infra* Part IV.

censes.[2] Defenders of license conditions made different points. Many argued that the market for wireless highspeed Internet access[3] was highly concentrated, and that license conditions requiring licensees to make transport services available on an open[4] wholesale basis could spark additional competition.[5] For example, the *Los Angeles Times* said in an edito-

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2. *See, e.g.*, Letter from Robert W. Quinn, Jr., AT&T, to Marlene H. Dortch, Sec'y, FCC (July 12, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150) (on file with author) (stating that "open access" conditions on auction would "deprive taxpayers of billions of dollars"); *see also* Kim Hart, *FCC Majority Backs Open-Access Plan for Airwaves*, WASH. POST, July 25, 2007, at D2 (noting Republican congressional representatives are unhappy with conditions on licenses because of possibly adverse effect on auction revenues).

3. The FCC defines "broadband" as anything over 200 Kbps; I use the term "highspeed to describe the same range of speeds. The word "broadband" is loaded with associations that are used to answer policy questions rather than add precision. *See* Susan P. Crawford, What Is Broadband Good For? (May 17, 2007) (unpublished manuscript, on file with author) (explaining difference between "broadband" and "highspeed access").

4. Comments of Consumer Federation of America, Consumers Union, & Free Press, *In re* Broadband Industry Practices, WC Docket No. 07-52, at 140 (Fed. Commc'ns Comm'n June 15, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519529519 [hereinafter CFA Comments]. The Consumer Federation of America (CFA) and their co-signers of the Comment to the FCC stated that:

> Open access simply means that the licensee sells access to the network on a wholesale basis at commercial rates. Any number of ISPs that choose to do so may come and buy bandwidth and compete for customers. Everyone shares the same transmitter and connectivity; they compete on customer service and price . . . . [An open access] network is neutral towards the devices and applications running on the network. Provided they do not harm the network, any innovative piece of software or hardware a company can dream up may connect to the network and sell to consumers.

Id. at 136.

5. A group calling itself the Public Interest Spectrum Coalition (PISC) argued that the FCC should designate 30 MHz of the 60 MHz available for commercial auction in the 700 MHz proceeding for "open access" wholesale use. *See* Ex Parte Comments of Public Interest Spectrum Coalition, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150, at 5 (Fed. Commc'ns Comm'n Apr. 5, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519108262 [hereinafter Comments of PISC]. *See also* Ex Parte Reply Comments of Public Interest Spectrum Coalition, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150 (Fed. Commc'ns Comm'n July 6, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519540425 [hereinafter Reply Comments of PISC]. PISC consists of the Consumer Federation of America, Consumers Union, Free Press, Media Access Project, New America Foundation, and Public Knowledge.

rial that "the point isn't to raise the most money for the Treasury, it's to generate the broadest public benefit from these valuable public airwaves. . . . The FCC should . . . require winning bidders to provide wholesale access to their networks."[6] Others argued that the most important element of the auction should be a requirement that the winner build a national public safety network.[7] Still others maintained that the auction should be focused on facilitating the development of new uses for wireless spectrum, including the introduction of new devices and new models of dynamic spectrum allocation.[8] Google's stated intent to bid $4.6 billion for a portion of the spectrum, if and only if the terms of the winner's license were written in the way Google wanted, made front-page headlines.[9]

The airwaves may be the most valuable natural resource that the government perceives itself as managing.[10] Both the FCC and Congress are

6. Editorial, *Frequencies for Sale*, L.A. TIMES, July 12, 2007, at A22.

7. Mark Fowler, Op-Ed., *Wireless Nation: FCC's Chance for a Great Network,* WASH. TIMES, July 5, 2007, at A15. Fowler, a former FCC Chairman, was a founding partner in Frontline Wireless, a company led by former FCC Chairman Reed Hundt, which was one of "the most vocal advocates" of such a public safety network. Kim Hart, *How to Sell the Airwaves?: FCC Must Choose Between Competing Network Visions*, WASH. POST, July 13, 2007, at D1 ("Fundamentally, the FCC will have to decide how it can drive wireless innovation and economic growth and if it's important to achieve a national public safety network. One has enormous economic implications for investors, and the other is important for policy." (quoting Blair Levin, an analyst with Stifel Nicolaus)).

8. Letter from Richard S. Whitt, Wash. Telecom & Media Counsel, Google Inc., to Marlene H. Dortch, Sec'y, FCC (May 21, 2007) [hereinafter Google May 21 Letter] (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150) (on file with author).

9. Miguel Helft & Stephen Labaton, *Google Pushes for Rules to Aid Wireless Plans*, N.Y. TIMES, July 21, 2007, at A1. AT&T quickly responded, with Jim Cicconi, AT&T Senior Executive Vice President, External and Legislative Affairs, saying "Google is demanding the Government stack the deck in its favor, limit competing bids, and effectively force wireless carriers to alter their business models to Google's liking." Posting of Om Malik to Gigaom, AT&T Responds to Google Bid, http://gigaom.com/2007/07/20/att-responds-to-google-wireless-bid/#more-9856 (July 20, 2007).

10. LINDA K. MOORE, CONG. RES. SERV., SPECTRUM MANAGEMENT: AUCTIONS 2 (2007) ("Spectrum is considered to be a natural resource . . . ."); J.H. SNIDER, NEW AM. FOUND., AN EXPLANATION OF THE CITIZEN'S GUIDE TO THE AIRWAVES (2003), *available at* http://www.newamerica.net/files/airwaves.pdf (assessing value of spectrum and comparing spectrum value to value of other economic goods); *see also id.* at 15 ("[Spectrum is] the most valuable natural resource of the information age." (quoting William Safire, *Spectrum Squatters,* N.Y. TIMES, Oct. 9, 2000, at A21)); J.H. SNIDER, NEW AM. FOUND., THE ART OF SPECTRUM LOBBYING: AMERICA'S $480 BILLION SPECTRUM GIVEAWAY, HOW IT HAPPENED, AND HOW TO PREVENT IT FROM RECURRING 38 (2007), *available at* http://www.newamerica.net/files/art_of_spectrum_lobbying.pdf [hereinafter SNIDER, ART OF SPECTRUM LOBBYING] (suggesting that the management of spectrum assets be integrated into systems for managing other natural resources and made more visible).

confronted with multiple demands in this area, including: (1) Congress's own budgetary needs; (2) the demands of existing communications companies;[11] and (3) the demands of would-be new entrants. The debate over the rules to be applied to the 700 MHz auction provides a useful case study of the role of the regulator in confronting the current central problem in communications regulation. That central problem is this: What is the "public interest" to be served by telecommunications regulation at a time when all formerly separate communication technologies (telephone, broadcast, cable, satellite) are converging into packet-switched, Internet Protocol (IP)-based online media? What problem should the FCC be trying to solve?

During the 1920s, the FCC's predecessor, the Federal Radio Commission, swept hundreds of thousands of amateur radio enthusiasts and other small operators into spectrum Siberia in order to placate large commercial operators, and claimed to be protecting the "public interest" by doing so.[12] The FRC apparently saw itself as able to dictate rules for use of spectrum that would be welcomed by the large commercial operators, despite concerns about the consequences of those rules. The FCC remains interested in protecting traditional communications stakeholders, but the Commission's role as an institution has changed substantially since the 1920s. It is now attempting to position itself as a rule-creator in the converged ecosystem of communications, and its task has become much more complex.[13] Satisfying one well-organized set of well-established companies (in the 700 MHz auction setting, the incumbent wireless carriers) will not necessarily create benefits for the FCC's role that outweigh the burdens of being attacked by all the other players.

This changed institutional role has been prompted by several key developments. First, the Commission recognizes that the technological landscape has changed dramatically. The Internet is the Black Swan of communications: a wildly unexpected event that is having an enormous effect on the world.[14] Access to the Internet is now extremely important to social

11. Existing telecommunications companies contribute heavily to candidates and lobby extensively. According to the Center for Responsive Politics, the telephone utilities industry, which includes both wireline and wireless telecommunications companies, has contributed $110 million to federal candidates from 1990-2008 and spent $381 million on lobbying from 1998-2007. *See* Open Secrets, Industry Totals: Telephone Utilities, http://opensecrets.org/industries/indus.asp?Ind=B08 (last visited Apr. 16, 2008); Open Secrets, Lobbying Spending Database, http://www.opensecrets.org/lobbyists (last visited Apr. 16, 2008).

12. *See infra* Part II.

13. *See infra* Section V.C.

14. NASSIM TALEB, THE BLACK SWAN (2007); *see* JOHN B. HORRIGAN, PEW INTER-

welfare.[15] Internet access, like clean water and electricity, provides a substrate for innumerable valuable developments, including economic growth, collaborative production, generation of new scalable ideas, and democracy—to name just a few. The economic and social effects of the Internet ethos of openness and flexibility are nudging the Commission to act differently.[16] Second, the Commission is paying attention to Congress, as it must. Congress, in turn, is paying more attention to communications issues, and has held key hearings questioning the FCC's approach to spectrum policy.[17] (At the same time, Congress has been anxious for the U.S. Treasury to receive the funds from the 700 MHz auction that it has been expecting for many years.)[18] Third, the FCC's own bureaucratic imperatives mandate that it retain and expand its role in the converged era. The Commission cannot risk alienating the entire (well-funded) online policy world by obviously favoring wireless carrier incumbents over online companies.

Yet the Commission's vision of the "public interest" remains incoherent, and the Commission still appears to believe that it is best for dominant private wireless carriers (the high-power radio broadcasters of our day) to be able to dictate in detail how the airwaves are used. Indeed, FCC Chairman Martin's rhetoric during the summer of 2007 about the importance of the Internet ethos of "choice"[19] did not result in auction rules that would necessarily have made such choices available. Although the Chairman pushed for limited "edge"-related rules (requiring that devices not be "locked" to the winning licensee's spectrum, and that consumers be al-

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NET & AM. LIFE PROJECT, BROADBAND: WHAT'S ALL THE FUSS ABOUT (2007), *available at* http://www.pewinternet.org/pdfs/BroadBand%20Fuss.pdf.

15. *See, e.g.*, ORG. FOR ECON. CO-OPERATION & DEV. [OECD], OECD COMMUNICATIONS OUTLOOK (2007), *available at* http://213.253.134.43/oecd/pdfs/browseit/9307021E.pdf. ("Increasing emphasis is being placed on broadband as an important infrastructure for economic growth and social development"); Joelle Tessler, *Re-Examining Broadband Using a Democratic Lens,* CONG. Q. WKLY., July 30, 2007 ("Broadband is no longer a luxury item. . . . It is an essential component of a strong America in an information age." (quoting Senator Daniel Inouye)).

16. *See infra* Section V.A.1.

17. *See, e.g., Wireless Innovation and Consumer Protection and the Internet: Hearing Before the Subcomm. on Telecomm. of the H. Comm. on Energy and Commerce,* 110th Cong. (2007), *available at* http://energycommerce.house.gov/cmte_mtgs/ 110-ti-hrg.071107.ConsumerProtection.shtml (the July 11, 2007 "iPhone hearing").

18. *See infra* Section IV.B.2.

19. *See, e.g.*, Frank Rose, *It's Silicon Valley vs. Telcos in Battle for Wireless Spectrum,* WIRED, May 16. 2007, http://www.wired.com/techbiz/media/news/2007/05/uhf_spectrum (quoting Chairman Martin: "It is important to use the upcoming auction to make sure there are more than just two competitors.").

lowed to use online applications without being blocked), the idea that licensees would be required to offer access on a wholesale, open-access basis—a proxy for common carriage[20] and the "Internet model" of Internet access—was abandoned.[21] Because the two dominant wireless carriers in this country, AT&T and Verizon Wireless,[22] already held the key spec-

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20. *See infra* Section III.A. Title II of the Telecommunications Act of 1996 defines common carriers (in a circular fashion) as companies "engaged as a common carrier for hire, in interstate or foreign communication by wire or radio of interstate or foreign radio transmission of energy." Telecommunications Act of 1996, Pub. L. No. 104-104 (codified at 47 U.S.C. 153(10) (2000)). A common carrier is a company that "makes a public offering to provide [communications facilities] whereby all members of the public who choose to employ such facilities may communicate or transmit intelligence of their own design and choosing." FCC v. Midwest Video Corp., 440 U.S. 689, 701 (1979). 47 U.S.C. § 202(a) prohibits common carriers from engaging in unjust or unreasonable discrimination, including making or giving any undue or unreasonable preference, or imposing any undue or unreasonable prejudice or disadvantage, on any person, class of persons or locality. "Common carriage" is an ancient concept. In a nutshell, common carriage principles "guarantee that no customer seeking service upon reasonable demand, willing and able to pay the established price, however set, would be denied lawful use of the service or would otherwise be discriminated against." Eli Noam, Beyond Liberalization II: The Impending Doom of Common Carriage (Mar. 15, 1994) (unpublished manuscript, on file with the Columbia University Working Papers Server Project), *available at* http://www.columbia.edu/dlc/wp/citi/citinoam11.html. Mandating that the auction winner (1) not discriminate against providers using its facilities to provide competing Internet access services; and (2) not discriminate against any particular use of its network would have been the modern-day equivalent of common carriage.

21. *See infra* Part IV. Wholesale, open-access licensees would have been required to build out the wireless network, own and operate cell sites and other equipment, and provide neutral, nondiscriminatory access to the Internet backbone. Simon Wilkie, *Open Access for the 700 MHz Auction: Wholesale Access Licensing Promotes Competition and Could Increase License Revenue,* NEW AM. FOUND. ISSUE BRIEF No. 21 (July 2007), *available at* http://www.newamerica.net/files/openaccess700mhz.pdf.

Some commentators also proposed a "no-retail" rule, which would constrain the licensee from offering any retail services whatsoever to end users; the licensee would be limited to providing basic transport to retail service providers on a nondiscriminatory basis. *See* Comments of Frontline Wireless, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150 at 17-18 (Fed. Commc'ns Comm'n May 23, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf &id_ document=6519415226.

22. AT&T and Verizon Wireless are the No. 1 and No. 2 wireless carriers in the country. *See* Marguerite Reardon, *Verizon and AT&T Compete for Wireless Subscribers*, CNET NEWS.COM, July 30, 2007, http://www.news.com/8301-10784_3-9751805-7.html. The two companies "do not compete at all in the residential phone market." *Id.* AT&T has about 70 million wireless subscribers and Verizon Wireless has about 64 million (as of Dec. 2007), of a total of 250 million subscribers nationwide. These two carriers together account for more than half the wireless subscriptions in the country and are the top spectrum-holders. Larry Avila, *A Wireless Nation*, THE POST CRESCENT (Appleton,

trum assets that are used for wireless access to the Internet, were committed to the "cellphone model" of Internet access,[23] and were likely to win (and did in fact win) the large-scale commercial licenses that were auctioned in the 700 MHz proceeding,[24] there is no real opportunity for any experimentation with the Internet model for wireless highspeed Internet access. The Commission appears to see its institutional task as balancing the political interests of self-described key stakeholders, and apparently thought that by providing minor concessions to online policy voices it could resolve their concerns without troubling Verizon and AT&T unduly.[25]

This Article provides a snapshot of communications policy in the U.S. at a particularly interesting time. But it has a larger normative point to make. The Commission needs to solve its "public interest" problem. It needs to recognize that the communications ecosystem of which it is a part is increasingly adopting the Internet ethos of open, no-permission-needed, neutral transport—pushed by a variety of events, including both the advent of a huge variety of mobile web devices (like the Amazon Kindle) and the creation of the Open Handset Alliance, a multinational group of manufacturers and service providers planning to promote Google's open-access "Android" platform[26]—but is being held back by the actions, spectrum control, and market power of the dominant wireless carriers, who are committed to beating back the idea of common carriage, or neutral trans-

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Wis.), Dec. 16, 2007, at 1E; *see also* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., U.S. Dep't. of Justice, 2007 Telecommunications Symposium—Voice, Video and Broadband: The Changing Competitive Landscape and Its Impact on Consumers (Nov. 13, 2007), *available at* http://149.101.1.32/atr/public/workshops/telecom2007/submissions/227840.pdf.

23. *See infra* Section IV.B.4. As Section V.A.1 notes, following the release of the auction rules both Verizon and AT&T made gestures toward openness that have very little substance.

24. Grant Gross, *Verizon Wireless Wins Large Chunk of 700 MHz Spectrum*, IDG NEWS SERV., Mar. 20, 2008, http://www.infoworld.com/article/08/03/20/Verizon-Wireless-wins-large-chunk-700MHz-spectrum_1.html; Posting of Chris Ziegler to Engadget, FCC Releases 700 MHz Details, Verizon, AT&T Big Winners, http://www.engadget.com/2008/03/20/fcc-releases-700mhz-auction-details-verizon-atandt-big-winners (Mar. 20, 2008) (Verizon won the 22-MHz C Block save in Alaska, Puerto Rico and the Gulf of Mexico, bidding $4.7 billion; AT&T won much of the B Block; together, Verizon and AT&T accounted for about $16 billion of the approximately $19 billion bid in the entire auction).

25. *See infra* Part V.

26. *See* Dana Gardner, *Android: Changing the Mobile Game*, LINUXINSIDER, Dec. 28, 2007, http://www.linuxinsider.com/story/60957.html; Brad Reed, *Mobile Internet Will Open Wide in 2008, IDC Says*, MACWORLD, Dec. 7, 2007, http://www.macworld.co.uk/ipod-itunes/news/index.cfm?newsid=19877.

port, at any cost.[27] These carriers have no interest in cannibalizing their current vertically integrated retail revenue streams. The Commission is (so far) acting to assist these carriers in their quest to avoid the Internet model of access, even as marketplace realities point in the opposite direction.

But the Commission should choose spectrum policy actions by weighing the benefits of facilitating long-term improved open highspeed Internet access against the short-term incentives of these particular incumbents. These incumbents have every incentive to pursue short-term economic goals that are not necessarily consistent with long-term improved Internet access.[28] The problem with the cellphone model of Internet access, given the market realities that prevail today, is that it establishes a few gatekeepers with ample market power to decide which online activities will be successful and which will not. These gatekeepers have every reason to favor their own online content over that of other actors. The cellphone model may favor the short-term interests of these dominant incumbents, but will not result over the long term in either an innovative environment for Internet use or improved Internet access for underserved populations—because it avoids direct competition in the provision of Internet access.[29] Tying this normative point back to the events of 2007-08, a wish to maximize overall improved open highspeed Internet access might have triggered the adoption of 700 MHz auction rules that limited the involvement of oligopolist[30] incumbents and mandated open, wholesale provision of access. Wholesale provision of access was the key to direct competition for Internet access; indeed, wholesale open access was the only way to make this spectrum allocation into a truly competitive proof-of-concept market for Internet access, online applications, and devices for online use.

This normative scaffolding should be helpful when the Commission faces its next spectrum policy decision in the so-called "white spaces" proceeding, in which the Commission will be reallocating unused televi-

27. *See infra* Section IV.B.4.

28. *See Net Neutrality and Free Speech on the Internet: Hearing Before the H. Comm. on the Judiciary*, 110th Cong. (2008) (prepared statement of Susan Crawford, Visiting Assoc. Professor of Law, Yale Law Sch.), *available at* http://judiciary.house.gov/media/pdfs/Crawford080311.pdf (making this argument).

29. More open broadband policies in other countries have prompted those countries to experience greater competition, lower prices, better service, and higher penetration of highspeed Internet access. *See* Comments of PISC, *supra* note 5, at 3, 7 (citing WIRELINE COMPETITION BUREAU, FCC, HIGH-SPEED SERVICES FOR INTERNET ACCESS: STATUS AS OF JUNE 30, 2006 (2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-270128A1.pdf).

30. Wilkie, *supra* note 21 (describing oligopolistic marketplace).

sion broadcasting spectrum.[31] In that proceeding, there will be a different incumbent (television broadcasters rather than telephone companies), but the same basic set of policy questions will be presented: Whose welfare, that of incumbents or that of the general public, should be taken into account? A future Commission can avoid another bare-knuckled political brawl by making clear that it intends to support highspeed, open, competitive, mobile Internet access as its top priority, and that it understands that creating unlicensed portions of the white spaces spectrum can further this goal. Given advances in transmission and reception technology, there is no real "scarcity" of white spaces spectrum, and thus no particular reason to propertize it; at the same time, we have a great need to experiment with unpropertized uses of spectrum for highspeed Internet access. The "public interest" calculations of the 1920s, which favored the private property interests of large commercial broadcast entities above all other goals, need to be adjusted. The institutional changes the FCC has undergone have put it in a position to make these adjustments.

This Article contributes to an extensive debate about the desirability of propertizing spectrum.[32] For the purposes of the 700 MHz auction, the question of propertization was answered by Congress; the FCC was required to auction off this spectrum, and the only open questions concerned the details of the auction rules. However, propertization of the white spaces spectrum is still an open issue. Unlicensed uses of the white spaces spectrum could allow for the experimentation with the Internet model of Internet access (in essence, common carriage, or separation between transport and content) that arguably was not permitted by the rules for the 700 MHz auction.

This Article proceeds in seven parts. Part II describes the institutional role of the FCC's predecessor agency in early radio regulation. Part III provides the competitive context for the 700 MHz auction, and Part IV presents the auction perspectives of the major players. Part V analyzes the Commission's response to those interests during the summer of 2007, and compares its institutional response to the 1920s spectrum policy contests. Part VI takes on the inherently normative and highly contested question of the "public interest" that the future Commission should serve. In light of the central role Internet access to converged communications will play in our collective future, we will need to move beyond the 100-year-old political assumptions and 40-year-old technical assumptions that currently shape telecommunications regulation. The FCC as an institution has al-

31. *See infra* Section VI.B.

32. *See infra* note 306.

ready begun to make this move, but has a long road to travel yet. Part VII discusses how the white spaces proceeding will provide another test case of its maturity.

II. EARLY RADIO REGULATION

At the conclusion of the Commission's work during the summer of 2007 on the 700 MHz auction rules, the FCC emerged with a negotiated arrangement that was generally believed to serve the interests of Verizon and AT&T, companies that together control more than 50% of the market for wireless subscribers.[33] There is nothing new under the sun. The Commission, like its predecessors, has often been interested in supporting well-financed incumbents.

Between 1906, when the crystal detector first became widely available, and 1912, when the first Radio Act was passed, hundreds of thousands of amateurs learned how to use radio equipment and were enthusiastically communicating across the "ether."[34] Indeed, radio had its own "rich web of cultural practices and ideas" long before regulators arrived.[35] But amateurs and new entrants were shoved aside by early regulators, in favor of established large commercial interests and the military, on at least three separate occasions.

Access to the "ether" was at first unrestricted: anyone with inexpensive homemade radio equipment could set himself up to transmit and receive signals.[36] The amateur dominated the air as of 1910:

> Hundreds of schoolboys in every part of the country have taken to this most popular scientific fad, and, by copying the instruments used at the regular stations and constructing apparatus out of all kinds of electrical junk, have built wireless equipments that in some cases approach the naval stations in efficiency.[37]

Indeed, by 1914 the amateurs had successfully tested a coast-to-coast relay network.[38] But by then their place in the spectrum hierarchy had been completely changed.

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33. *See infra* Section V.B.

34. SUSAN J. DOUGLAS, INVENTING AMERICAN BROADCASTING 1899-1922, 195, 198 (1987).

35. *Id.* at xv.

36. *Id.* at xxvii.

37. *Id.* at 195 (quoting Robert A. Morton, *The Amateur Wireless Operator*, OUTLOOK, Jan. 15, 1910, at 131).

38. *Id.* at 206.

The Radio Act of 1912[39] established a number of key principles: all broadcasters would need a license from the Secretary of Commerce, no one could broadcast without a license, and spectrum would be allocated to particular uses.[40] Essentially, the Act established that "some communication was more important than others," and made clear that the federal government would make these decisions.[41] What established communications merit in 1912 was "capital investment or military defense."[42] In particular, the Act instructed amateurs that they could no longer roam frequencies transmitting at will. Rather, they could listen in anywhere they liked, but could transmit only on very shortwave frequencies and at low power.[43] In effect, the amateurs were consigned to oblivion because these shortwaves were considered technologically unusable at the time.[44]

A few years later, in 1923, Secretary of Commerce Herbert Hoover reallocated most spectrum use in one fell swoop, without statutory authority.[45] Major commercial stations received favorable, high-power assign-

39. Act of Aug. 13, 1912, ch. 287, 37 Stat. 302 (1912) (repealed by Radio Act of 1927, ch. 169, 44 Stat. 1162 (1927)). The enactment of the Radio Act was prompted by the Titanic disaster, "when 'chaos in the spectrum' was said to have confused a potential rescue ship 'so it missed the calls of help from the sinking luxury liner.'" JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET 232 (2005).

40. THOMAS G. KRATTENMAKER & LUCAS A. POWE, REGULATING BROADCAST PROGRAMMING 6 (1994).

41. *Id.*

42. DOUGLAS, *supra* note 34, at 237. As discussed below, the 1912 Act "favored the Navy by awarding it a dominant position in the electromagnetic spectrum and by specifically protecting its stations from interference by private companies." PHILIP T. ROSEN, THE MODERN STENTORS: RADIO BROADCASTERS AND THE FEDERAL GOVERNMENT, 1920-1934 (1980). Major corporations made investments in technology, to the extent that "after 1912, it was [several large-scale] corporations, not individuals, who controlled continuous wave technology." DOUGLAS, *supra* note 34, at 255.

43. DOUGLAS, *supra* note 34, at 234.

44. *See* KRATTENMAKER & POWE, *supra* note 40 at 6; DOUGLAS, *supra* note 34, at 316; ROSEN, *supra* note 42, at 21 (noting the Act "relegated amateur use to frequencies above 1500 kHz, which at the time were considered unusable.").

45. Herbert Hoover, Secretary of Commerce from 1921 to 1928, called for strong federal regulation of the airwaves as early as 1922, and was "a staunch and unceasing advocate of strong federal regulation for broadcasting." Daniel E. Garvey, *Secretary Hoover and the Quest for Broadcast Regulation,* 3 JOURNALISM HIST. 67 (1976). For a description of Hoover's personal role in early radio regulation, and particularly his willingness to act without statutory authority, see ROSEN, *supra* note 42, at 57. Rosen writes:

> He assigned channels, although the Radio Act of 1912 neither made nor authorized any distribution of frequencies to individual stations. He placed commercial operators in the band from 187.5 to 500 kHz, although both domestic and international law protected the government

ments, while many nonprofit stations "emerged with severely truncated frequency rights."[46]

Hoover had stated early on that "it becomes of primary public interest to say who is to do the broadcasting, under what circumstances, and with what type of material," thus linking radio regulation to the "public interest."[47] He was "somewhat less favorably inclined" to the words "convenience and necessity,"[48] which the 1927 Congress used in creating the governing statute for a Federal Radio Commission that would be independent of Hoover's control.[49]

In 1927-28, the newly formed, not well-funded Federal Radio Commission (FRC) needed to decide what "public interest, convenience, or necessity" meant. The FRC, shaped by several Hoover-run radio confer-

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> reservation. He reallocated channels, although the same laws specified wavelengths for certain groups of radio users.

Id. Hoover has been described as the "political champion of major radio broadcasters." Thomas W. Hazlett, *The Rationality of U.S. Regulation of the Broadcast Spectrum*, 33 J.L. & ECON. 133, 152 (1990).

46. Hazlett, *supra* note 45, at 157. Hoover assigned the most-preferred and least-congested wavelengths to the high-power stations, while consigning the low-power stations to the one wavelength that was already overcrowded; AT&T, GE, and Westinghouse owned high-power stations while universities, churches, and labor unions owned low-power stations. DOUGLAS, *supra* note 34, at 316; Hazlett, *supra* note 45, at 146; ROSEN, *supra* note 42, at 57.

47. Garvey, *supra* note 45, at 67 (citing Herbert Hoover, Sec'y of Commerce, Speech to the first National Radio Conference: Value of Radio Phones (Feb. 27, 1922), *in* BOSTON EVENING TRANSCRIPT, May 4, 1922, at 5).

48. According to Daniel E. Garvey, Hoover wrote:

> [T]here is growing demand for the limitation of the number of stations in a given area, and that such a limitation would be based on the service needs of the community, just as public utilities are generally limited by the rule of public convenience and necessity. Again this enters a dangerous field of recognizing monopoly and implied censorship.

Garvey, *supra* note 45, at 70 (citing Letter from Herbert Hoover, Sec'y of Commerce, to Wallace H. White, Congressman). Hoover shied away from the public-utility phrasing, preferring such terms as "public service to the listener." *Id.*

49. The 1927 Radio Act provided that the new Commission shall, "as public convenience, interest, or necessity requires" classify radio stations, prescribe the nature of the service, assign bands of frequencies or wavelengths, determine the power, time, and location of stations, and regulate the kind of apparatus to be used. Radio Act of 1927, ch. 169, § 4, 44 Stat. 1162 (1927) (absorbed into the Communication Act of 1934). The 1927 Act's provisions were absorbed into the 1934 Act, and these core provisions are still with us, largely intact. Communication Act of 1934, ch. 652, 48 Stat. 1064 (later codified as 47 U.S.C § 151 et seq); ROSEN, *supra* note 42, at 105 ("While the standard of public interest, convenience, and necessity lacked direct precedent in any federal law, its interpretation constituted the fundamental requirement for securing a permit for many years to come.").

ences[50] and seven years of Department of Commerce control of spectrum, decided that applicants with "superior technical equipment, adequate financial resources, skilled personnel, and the ability to provide continuous service" should be given preference.[51] In effect, the FRC found that priority and market success were the appropriate measures of the "public interest."[52] The new Radio Commission decided that the "public interest" would favor licensees that were serving the general public rather than any narrower interest. "Using this logic, it labeled facilities operated by colleges and universities, religious institutions, and city and state governments 'propaganda stations.' . . . By such special interpretation of already ambiguous [public interest, convenience, and necessity] guidelines, the FRC favored the corporate giants."[53]

In November 1928, in an echo of Hoover's 1923 steps, the Radio Commission changed the assignments of 94% of all broadcasting stations as part of a comprehensive reallocation scheme.[54] One of the commissioners later reflected: "We had to make some moves in a rather high-handed way . . . . We took a lot of hearsay and I fear we did a lot of injustices."[55] The FRC rewarded with further free spectrum applicants who had already held large assignments of spectrum and had achieved financial success in operating stations.[56] Thomas Hazlett has pointed out that this implementation of a "right of user" or "priority-in-use" method for assigning licenses was a shrewd political move that shored up support for the FRC among the large companies whose support the FRC felt it needed.[57] Susan Douglas argues that the federal government's "preferential treatment toward the technologically most powerful (and richest) commercial stations, and

50. *See* Yochai Benkler, *Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment*, 11 HARV. J.L. & TECH. 287, 299 (1998); *see also* Hazlett, *supra* note 45, at 152, 154 ("The Commission favored applications with superior technical equipment, adequate finances, experienced personnel, and the ability to operate without interruption. These were Hoover's policies, and they favored established commercial broadcasters."). The annual Washington Radio Conferences organized by Hoover from 1922 to 1925 were an expression of these policies and comforted the large commercial broadcasters that Hoover had their interests at heart. DOUGLAS, *supra* note 34, at 315. These conferences were "organized to recommend possible legislative solutions to Congress after examining the problems confronting radio users." ROSEN, *supra* note 42, at 39.

51. ROSEN, *supra* note 42, at 133.

52. Hazlett, *supra* note 45, at 157; ROSEN, *supra* note 42, at 133.

53. ROSEN , *supra* note 42, at 133-34.

54. *See id.* at 134; KRATTENMAKER & POWE,, *supra* note 40, at 21; *see also* General Order 40, Minutes, 11 September 1928, NARG 173, FCC, reel 1.1.

55. KRATTENMAKER & POWE, *supra* note 40, at 21.

56. *Id.* at 22.

57. Hazlett, *supra* note 45, at 168.

regulatory marginalization of smaller, noncommercial stations, persisted through the Radio Act of 1927 and the Communications Act of 1934."[58] While speaking in terms of the public interest, the Radio Commission chose to further the ends of well-financed incumbents.[59]

It is striking how little spectrum policy has changed.

III. CONVERGENCE AND (LACK OF) COMPETITION

The stakes for the 700 MHz auction were high. We are at an inflection point in communications history. Although all earlier communications modalities (cable, broadcast, telephone) are collapsing into one—packet-switched online communications—the existing communications incumbents have sufficient market power to keep their desired business models in place. This Part describes the "Internet" model of communications (open, nondiscriminatory, allowing for innovation at the edge of the network) and contrasts it with the "Cellphone" model (controlled network, manager able to charge for and discriminate with respect to particular communications).

A. Models of Internet Access: History

The 700 MHz auction occurred at a particularly interesting time in communications history. Traditional telephone use is shrinking and the cultural sway of broadcasters is diminishing, while Internet use and cellphone use are growing quickly.[60] Although the telecommunications industry has long been divided up into different silos (cable, broadcast, telephony, data), all of these segments are arguably converging into one packet-switched[61] communications realm.[62] Highspeed packetized communica-

58. DOUGLAS, *supra* note 34, at 316.

59. Hazlett, *supra* note 45, at 158.

60. *See generally* OECD, *supra* note 15. Informa, a market research firm, found that "global revenues from fixed-line voice calls were around $600 billion in 2005, and data revenues were $202 billion. By 2010 . . . fixed-line calls will account for less than half of operators' revenues in the developed world. Instead, their new core product will be broadband Internet access." JIM KOHLENBERGER, UNIVERSAL AFFORDABLE BROADBAND FOR ALL AMERICANS 11 (Benton Found. 2007). A late-2007 Deloitte & Touche report found that usage of cell phones as entertainment devices increased by 50% over just eight months of 2007—from 24% of U.S. consumers to 36%. Gail Schiller, *Americans More Wired: Survey*, REUTERS, Dec. 28, 2007, http://www.reuters.com/article/industryNews/idUSN2844258220071231 (reporting results of Deloitte & Touch "State of the Media Democracy" survey). About 62% of 13-to-24-year-olds use their cell phones as entertainment devices, and 47% of consumers 25-to-41-years-old. *Id.* About 45% of those surveyed said they were creating their own public online content through editing photos, videos, or music. *Id.*

61. Kevin Werbach, *Supercommons: Toward a Unified Theory of Wireless Commu-*

tions are becoming the key communications medium.[63] The central question is which *model* of packetized communications will prevail: will we converge on a set of proprietary, walled-garden networks, in which the network provider acts as a gatekeeper by deciding which communications (in terms of content, application used, protocol used, how expensive they are) move easily across its network and onto the (authorized) handsets of users (the cellphone model), or will we converge on the Internet model, in which the network provider makes available an interconnected, nondiscriminatory, commodity transport service (essentially, a utility connectivity product) on which competitive communications travel that can be introduced without the knowledge or permission of the network provider and can be accessed via any handset?

The birth of the "Internet model" (perhaps counterintuitively for many readers) relied heavily on extensive government intervention requiring that telephone companies provide services on a "common carriage" basis.[64] Until very recently, the telephone companies ("telcos") were required to provide telecommunications services on this basis, which meant that they could not discriminate against anyone wishing either to connect to their network or to use their facilities to compete with them.[65] Starting in the 1960s, the telcos were also required to permit competitors to attach de-

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nication, 82 TEX. L. REV. 863, 869 n.21 (2004) ("Packet-switching means that information is split into small data 'packets,' which are routed independently through the networks and reassembled on the receiving end. This contrasts with the 'circuit-switched' model of the telephone network, which holds open a dedicated channel for each call.").

62. *See generally* RICHARD D. TAYLOR, TIME FOR CHANGE: TRANSFORMING FUNDING FOR BROADBAND UNIVERSAL SERVICE (Benton Found. 2007) (arguing that soon voice, video, and all other communications will be delivered over IP networks); *see also* Press Release, Int'l Telecomms. Union, ITU Announces First Global Set of Standards for IPTV (Dec. 18, 2007), *available at* http://www.itu.int/newsroom/press_releases/2007/40.html ("A combination of voice, Internet and video services over a single broadband link and from a single provider is foreseen as the ultimate goal of the broadband revolution.").

63. OECD, *supra* note 15, at 19.

64. The next three paragraphs are based on Susan P. Crawford, *Network Rules*, 70 LAW & CONTEMP. PROBS. 51 (2007).

65. *See generally* ITHIEL DE SOLA POOL, TECHNOLOGIES OF FREEDOM 75-79 (1983) (discussing history of common carriage in the United States); JoAnne Holman & Michael A. McGregor, *The Internet as Commons: The Issue of Access*, 10 COMM. L. & POL'Y 267, 279-80 (2005) (relating that as early as ICC regulations created pursuant to the Interstate Commerce Act of 1897, regulations have classified the telephone industry as a public utility and a common carrier). Internet access providers were classified as common carriers until 2005, when the Supreme Court ruled in *Brand X* that they instead may be regulated as "information services" providers. Nat'l Cable & Telecomms. Ass'n. v. Brand X Internet Servs., 545 U.S. 967 (2005).

vices to these networks, as long as the devices were certified not to cause harm to the network.[66] This open network made growth of the Internet possible in the U.S. because consumers could get flat-rate, dial-up Internet access and attach modems to telephone connections that allowed their computers to act like phones. By contrast, both cable and wireless companies have been permitted (largely) to act as private, vertically integrated networks without a great deal of FCC regulation.[67]

Although telephone companies were initially unenthusiastic about acting as Internet service providers (ISPs) and connecting their subscribers to the Internet, they prospered when subscribers bought extra lines to allow them to go online through other ISPs. The phone companies prospered again when subscribers bought their proprietary DSL services, enabling Internet access at even higher speeds (one to two Mbps).[68] The explosive growth of the Internet took these phone companies by surprise, however, and they became unhappy with requirements to provide flat-rate, open access to online resources. Their dissatisfaction increased when use of online voice services (VoIP) began to undermine their traditional telephone revenues.

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66. *See* Kevin Werbach, *The Federal Computer Commission*, 84 N.C. L. REV. 1, 18-19 (2005) (describing *Carterfone* history and Part 68 rules); Jason Oxman, *The FCC and the Unregulation of the Internet* (Office of Plans & Policy, FCC, Working Paper No. 31, 1999), *available at* http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp31.pdf.

67. *See, e.g.*, 47 U.S.C. § 541(c)-(d) (2000) (cable systems not subject to regulation as common carriers; states may not regulate cable systems when they provide communications services other than cable services).

68. Both dial-up and digital subscriber line (DSL) access run across traditional telephone copper wires. *See* CISCO SYSTEMS, *Digital Subscriber Line*, *in* INTERNETWORKING TECHNOLOGY HANDBOOK, at 21-1, http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/dsl.pdf. DSL is a modem technology that converts existing copper telephone lines into two-way highspeed data conduits. *Id. See also* ANGELE A. GILROY & LENNARD G. KRUGER, CONG. RES. SERV., BROADBAND INTERNET REGULATION AND ACCESS: BACKGROUND AND ISSUES 2 (2007). This technology only works within about three miles of a central office facility. *Id.* at 2. DSL devotes certain frequencies on traditional copper phone lines to data transmission and is faster than dial-up because (in part) it does not need to go through a circuit switch but instead goes directly to the packet-switched network. Each end of the phone line must have a DSL modem, which will transmit and receive all data (without conversion) as a digital signal. GOV'T ACCOUNTABILITY OFFICE, PUBL'N NO. GAO-06-426, TELECOMMUNICATIONS: BROADBAND DEPLOYMENT IS EXTENSIVE THROUGHOUT THE UNITED STATES, BUT IT IS DIFFICULT TO ASSESS THE EXTENT OF DEPLOYMENT GAPS IN RURAL AREAS 22 (2006), *available at* http://www.gao.gov/new.items/d06426.pdf. DSL speeds in the United States are about 1.5 to 3 Mbps (about 50 to 100 times the speed of a 28 Kbps dial-up modem), while ADSL speeds may reach 8 Mbps. *Id.* at 8. The FCC defines highspeed Internet access as anything over 200 Kbps, which is alarmingly slow. FCC, What Is Broadband? (Apr. 11, 2007), http://www.fcc.gov/cgb/broadband.html.

The telcos initially made strong "level playing field" arguments against cable modem[69] providers, arguing strenuously that cable companies providing Internet access should be subject to the same common carriage and other burdens under which the telcos were operating.[70] But as of March 2002, the cable companies had obtained from the FCC the promise that the highspeed Internet access service they provided would not be regulated as a "telecommunications service" by the FCC—so neither common carriage (nondiscrimination) nor "open access"/"unbundling" obligations would be imposed on them.[71] Between 2002 and 2005 the telcos switched gears and fought hard to remove their own regulatory obligations, pointing out that new investment in fiber networks[72] would be

69. Highspeed Internet access service provided by cable companies is called "cable modem" service. Cable modem service, which competes directly with DSL, uses home cable network pipes (hybrid fiber coaxial networks) that are connected to ethernet network cards inside computers. Cable facilities are connected via highspeed links directly to the Internet.

70. *See, e.g., MSOs Sued on Open Access*, TELEVISION DIGEST, Nov. 1, 1999 (describing suit by Bell company GTE against cable modem service provider and quoting GTE executive William Barr as saying "You shouldn't let the person who owns the driveway dictate where people go."); BOB JACOBSON, BROADBAND-CABLE: THE OPEN-ACCESS DEBATE (1999), http://www.netaction.org/broadband/cable/cable.pdf (cable-industry-side white paper describing Bell arguments) ("Led by regional monopolies like SBC Communications and GTE, the local telephone companies are asking policy makers to impose onerous carriage conditions on cable broadband service.").

71. *See generally In re* Inquiry Concerning Appropriate Regulation of High-Speed Access to the Internet over Cable and Other Facilities, 17 F.C.C.R. 4798 (Mar. 14, 2002) (holding that cable companies are not subject to common-carriage obligations). "Open access" and "unbundling" mean roughly the same thing, as a practical matter. The 1996 Telecommunications Act directed incumbent local telephony carriers to unbundle elements of their networks for lease to providers of competitive local exchange services at FCC-mandated wholesale rates. This allowed multiple ISPs to offer service and defeat the telco monopoly. Since the Act came into force twelve years ago, the FCC has been mired in litigation over what precisely their unbundling rules are—which elements have to be unbundled, and at what prices. *See* AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999). (vacating and remanding key unbundling rules from Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 61 Fed. Reg. 45,476 (Aug. 29, 1996) (to be codified at 47 C.F.R. pts. 1, 20, 51, 90)); U.S. Telecomm. Ass'n v. FCC, 290 F.3d 415 (D.C. Cir. 2002) (remanding the FCC's new network elements rules, announced at 65 Fed. Reg. 2367, and its new rules for sharing the local loop, announced at 65 Fed. Reg. 1331); Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 68 Fed. Reg. 52,276 (Sept. 2, 2003) (to be codified at 47 C.F.R. pt. 51) (final rule) (setting out more rules).

72. "Optical fiber cable, already used by businesses as high speed links for long distance voice and data traffic, has tremendous data capacity, with transmission speeds dramatically higher than what is offered by cable modem or DSL broadband technology."). GILROY, *supra* note 68, at 3.

stunted if they did not have control over their networks similar to that of the cable companies. As of February 2003, the FCC made clear that neither common carriage nor unbundling requirements would be imposed on new fiber to the home (FTTH) installations by the telcos, and in October 2004 the Commission eliminated these obligations for fiber to the curb (FTTC) projects.[73] Immediately following the summer 2005 decision in *National Cable & Telecommunications Association v. Brand X Internet Services*,[74] which deferred to the FCC's determination that cable modem services were not subject to common carriage or unbundling obligations, the telephone companies demanded that DSL services be similarly released from any requirement to connect to all ISPs or carry all services without discrimination. In August 2005, they achieved this goal with the issuance of the FCC's Wireline DSL order.[75] Thus, network operators providing DSL, fiber, and cable packetized communications have over the last few years obtained regulatory approval allowing them to provide the managed, cellphone model of packetized communications (non-common-carriage), whether in connection with selling their own content (*e.g.*, subscription cable channels) or selling access to the Internet. All major providers of Internet access in this country are vertically integrated, providing retail online "services" as well as transport.[76]

As the distinctions between previously separate communications networks disappear, what might have seemed like a request for an exception from a general rule ("we want new private highspeed networks not to be treated like traditional telephone networks") may actually be a complete shift ("no network access used for communications should be subject to nondiscrimination rules"). Public pressure has kept DSL, fiber, and cable Internet access providers from blocking many Internet communications,

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73. Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 68 Fed. Reg. at 52,279; Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 69 Fed. Reg. 77,950, 77,952 (Dec. 29, 2004) (to be codified at 47 C.F.R. pt. 51).

74. Nat'l Cable & Telecomm. Ass'n. v. Brand X Internet Servs., 545 U.S. 967 (2005).

75. Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, 70 Fed. Reg. 60,222, 60,223-25 (Oct. 17, 2005) (to be codified at 47 C.F.R. pts. 51, 63, 64) (classifying wireline broadband Internet access service (DSL) as an information service under the Communications Act, and thus no longer subject to common-carrier regulations under Title II of the Act).

76. *See Net Neutrality and Free Speech on the Internet: Hearing Before the H. Comm. on the Judiciary*, 110th Cong. (2008) (prepared statement of Caroline Fredrickson, ACLU Washington Legislative Office), *available at* http://judiciary.house.gov/media/pdfs/Fredrickson080311.pdf (describing history of net neutrality and relevant regulatory changes).

although there have been some instances of degradation and interference.[77]

B. Wireless Carriers

The wireless carriers have *always* had the cellphone model, and have had no compunctions about using their control over their authorized handsets to limit users' Internet activities and exact 40 to 50 percent of applications developers' revenues for access to these users.[78] Wireless companies to date have been very careful about what they let cellphone subscribers do online.[79] Access to online applications (like map services and e-mail) and the ability to use a device of one's own choice are both sharply limited by wireless carriers.[80] A phone sold in a Verizon store will work only on

77. For example, in August 2007, during the live Lollapalooza Webcast of the Seattle band Pearl Jam, AT&T muted lead singer Eddie Vedder just as he began to sing a lyric attacking President Bush. Nate Anderson, *Pearl Jam Censored By AT&T, Calls for a Neutral 'Net*, ARS TECHNICA, Aug. 9, 2007, http://arstechnica.com/news.ars/post/20070809-pearl-jam-censored-by-att-calls-for-a-neutral-net.html. In October 2007, an Associated Press investigation demonstrated that Comcast was throttling or blocking peer-to-peer file-sharing programs like BitTorrent, Gnutella, and Lotus Notes. Chris Soghoian, *Comcast To Face Lawsuits Over BitTorrent Filtering*, CNET NEWS.COM, Oct. 23, 2007, http://www.news.com/8301-10784_3-9802410-7.html. *See also* PETER ECKERSLEY, FRED VON LOHMANN & SETH SCHOEN, ELEC. FRONTIER FOUND., PACKET FORGERY BY ISPS: A REPORT ON THE COMCAST AFFAIR (2007), http://www.eff.org/files/eff_comcast_report2.pdf (explaining why what Comcast did amounted to blocking of these applications). Comcast takes the position that its blocking is reasonable network management. *Id.*

78. *The 700 MHz Auction: Public Safety and Competition: Hearing Before the S. Comm. on Commerce, Science and Transportation*, 110th Cong. (2007) (prepared statement of Amol R. Sarva, Wireless Founders Coalition for Innovation), *available at* http://commerce.senate.gov/public/_files/Testimony_AmolSarva_SarvaWrittenStatement0.pdf, at 8-9 (describing barriers created by incumbent wireless companies to new devices or services that entrepreneurs wish to introduce); Wilkie, *supra* note 21, at 2 (describing history of wireless companies' control over their networks and current market realities).

79. *See* S. DEREK TURNER, FREE PRESS, 'SHOOTING THE MESSENGER' MYTH VS. REALITY: U.S. BROADBAND POLICY AND INTERNATIONAL BROADBAND RANKINGS 25 (2007) ("[T]he offerings from [wireless providers] are slow, expensive, and extremely restrictive, making them unattractive as a true competitor to the current duopoly."). All of the major mobile carriers are vertically integrated, acting as retail providers of content and application as well as transport providers.

80. *See* Tim Wu, *Wireless Net Neutrality: Cellular* Carterfone *and Consumer Choice in Mobile Broadband* (New Am. Found. Working Paper No. 17, 2007), *available at* http://www.newamerica.net/files/WorkingPaper17_WirelessNetNeutrality_Wu.pdf. Until the FCC's 1968 seminal *Carterfone* decision, which allowed non-AT&T equipment to be connected to the telephone network, consumers were not free to buy and use devices of their own choice for telephone communications. *In re* Use of the Carterfone Device in Message Toll Tel. Serv., 13 F.C.C.2d 420 (1968). *Carterfone* led to the broad use of the modem, and arguably the birth of the commercial Internet. *See* Oxman, *supra* note 66. But this open attachment regime has not to date applied to the wireless world. *See*

the Verizon network. The incumbents also often require two-year contracts with heavy termination penalties.[81]

C. The Internet Model

Meanwhile, however, the Internet model is gathering steam in terms of user preferences and visible economic benefits for society. The Internet (as it is currently architected) is indifferent to the nature of the packets that use its protocols; it is the first communications medium that allows separation of "content" from "transport."[82] Although the "highway" metaphor for the Internet is both overused and misdescriptive in some ways, it is a useful one in the following sense: just as a highway does not act differently based on the brand of car using it, the Internet does not now transport packets differently based on the content (voice, video, data) of those packets.

By contrast to (1) the cellphone world, in which a decade of "walled gardens" of innovation and content have given us nothing more advanced than expensive ringtones, and (2) the traditional telephone network, in which more than a hundred years of control have given us nothing more

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Jessica E. Vascellaro, *A Fight Over What You Can Do on a Cellphone,* WALL ST. J., June 14, 2007, at A1; Marguerite Reardon, *Unlock the Cell Phone? It's A High-Stakes Debate*, CNET NEWS.COM, July 16, 2007, http://www.news.com/Unlock-the-cell-phone-Its-a-high-stakes-debate/2100-1039_3-6196718.html; Kim Hart, *FCC to Rule on Wireless Auction: Lobbying Intense As Google Seeks To Open Market*, WASH. POST, July 30, 2007, at A1 ("Currently, the major U.S. wireless carriers, including AT&T and Verizon Wireless, largely decide which Web sites, music-download services and search engines their customers can access on their cellphones. . . . [W]ireless companies determin[e] which cellphones will receive their services: AT&T, for example, is the only carrier available to users of Apple's iPhone."); *see also* Letter from Wireless Founders Coalition for Innovation, to Marlene H. Dortch, Sec'y, FCC (June 7, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519520321. In general, "incumbent wireless carriers . . . routinely choke bandwidth to users, cripple features, and control the user experience" in order to protect their broadband offerings. Comments of PISC, *supra* note 5, at 12. For example, Apple's iPhone comes with a two-year contract with AT&T, which is the exclusive carrier for the iPhone until 2009. The iPhone may not be used on any networks other than AT&T's.

81. *Wireless Innovation and Consumer Protection: Hearing Before the Subcomm. on Telecomm. and the Internet of the H. Comm. On Energy and Commerce*, 110th Cong. (2007) (prepared statement of Christopher Murray, Senior Counsel, Consumers Union), *available at* http://energycommerce.house.gov/cmte_mtgs/110-ti-hrg.071107.Murray-Testimony.pdf (describing locked phones that cannot be switched between service providers, and two-year contracts with heavy penalties).

82. Telephone networks are optimized for voice services; cable and broadcast networks are optimized for one-way broadcasts. *See generally* Crawford, *supra* note 64.

advanced than voicemail and conference calls, the interactive Internet has provided the impetus for startlingly quick and sweeping innovation. It is the first medium we have that separates form-of-transport from form-of-communication, removing the tie that made telephone networks optimized for voice, broadcast networks optimized for television broadcasts, and cable networks optimized for cable shows. Users are greatly attracted to the interactive and social resources available online.

Entrepreneurs are launching new Internet ventures that can attract capital from investors. But investors need to be willing to run the risk that DSL, fiber, and cable network providers will pull the rug out from under these new ventures by, for example, slowing, charging differentially for, or otherwise degrading the availability of applications that the network provider views as competing with its own services—no law prevents such activity on the part of network providers.[83]

At the same time, the U.S. is falling behind the rest of the world in highspeed Internet penetration at a rapid clip.[84] As of November 2007, the U.S. ranked 15th among the countries of the world in highspeed Internet penetration (number of subscribers per hundred people) and 21st for high-speed access price.[85] Although speeds of 100 megabits per second are common in Denmark, Japan, Romania, Iceland, Slovenia, Dubai, Kuwait, and in cities in Europe, we in the U.S. pay more than people in those countries and cities for less-than-2.5 megabits per second speeds.[86] According to the Wall Street Journal, "[t]he U.S. is ranked 25th in broadband penetration, behind countries including South Korea, where penetration is 89%, and Canada, where it is 63%."[87] By contrast, in 2001 an OECD study

83. This has long been an issue prompted by price-discriminating monopolistic offerors of infrastructure businesses. *See* Andrew Odlyzko, Network Neutrality, Search Neutrality, and the Never-Ending Conflict Between Efficiency and Fairness in Markets, at 9 (Jan. 8, 2008) (unpublished manuscript), *available at* http://ssrn.com/abstract=1095350 (noting with respect to 19th century railroads that "[t]he setting where a monopoly infrastructure business, in pursuit of its own ends, could take arbitrary steps that would ruin one business and make another succeed, were regarded as inimical to a really free market").

84. Steven Levy, *True or False: U.S.'s Broadband Penetration is Lower Than Even Estonia's*, NEWSWEEK, July 2, 2007, *available at* http://www.msnbc.msn.com/id/19389299/site/newsweek. Many argue that the U.S. highspeed Internet access market is slumbering because of anticompetitive behavior by telco and cable incumbents.

85. Website Optimization L.L.C., November 2007 Bandwidth Report (Nov. 19, 2007), http://www.websiteoptimization.com/bw/0711.

86. KOHLENBERGER, *supra* note 60, at 3.

87. Jessica E. Vascellaro, *Is High-Speed Internet Growth Slowing? As Dial-Up Upgrade Level Off, Operators Offer New Services,* WALL ST. J., Aug. 9, 2007, at B3.

found that the U.S. was fourth in broadband penetration.[88] In America, the price of Internet access is high and speeds are slow. The network providers argue that if they are permitted to "manage" their networks (the cellphone model of access), charging differently for particular uses and being able to make exclusive deals of various kinds, they will be able to charge users perfectly at rates the users are willing to pay. Wall Street will also be pleased by price discrimination abilities, the providers claim, and thus the providers will attract greater investment. They also claim that this investment will then enable them to invest more in infrastructure, which will in turn result in greater penetration of highspeed Internet access in this country.[89] At the same time, users are generally happier with flat rates (the Internet model of access) rather than differential pricing (think voice calls);[90] competition driven by "Internet model" access mandates has pushed highspeed Internet access penetration and economic growth forward in other countries; and we have very little (if any) actual empirical evidence to support the network providers' claims that building Internet infrastructure will be too expensive unless they are permitted to discriminate.[91]

Nothing goes away, and these private operators (wireline and wireless) will operate "walled gardens" of content for some time that have no real connection to the Internet (as we understand "the Internet" today). The issue is, however, whether these same actors in their roles as providers of

88. DIRECTORATE FOR SCI., TECH. & INDUS., ORG. FOR ECON. CO-OPERATION & DEV., PUBL'N NO. DSTI/ICCP/TISP(2001)2/FINAL, THE DEVELOPMENT OF BROADBAND ACCESS IN OECD COUNTRIES (2001), *available at* http://oecd.org/dataoecd/48/33/2475737.pdf.

89. *See, e.g.,* Comments of Hands Off the Internet, *In re* Broadband Industry Practices, WC Docket. No. 07-52, at 9-13 (Fed. Commc'ns Comm'n Feb. 13, 2008), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519841089 (making these arguments).

90. *See* Odlyzko, *supra* note 83, at 13 ("Yet more circumstantial evidence that nondiscriminatory communications systems should be viable comes from the wireline voice network. That is still the big revenue producer on the wireline side, but operates in an exemplary net neutral fashion, and is, to an increasing extent, paid for by flat fees. . . .").

91. *Id.* at 14 ("Thus if the operators [ ] feel that they need additional revenues [beyond flat fees], they should present some detailed data to support their case. Unfortunately such data has not been available, and the whole net neutrality debate has been carried out in vague and unquantified terms."). Indeed, it may be cheaper to run a best-effort network, and install more fiber, than to impose a cellphone-like charging model on that network. *See* William Lehr, Economic Case for Dedicated Unlicensed Spectrum Below 3GHz (May 17, 2004) (unpublished manuscript), *available at* http://itc.mit.edu/itel/docs/2004/wlehr_unlicensed_doc.pdf ("[I]t may continue to be cheaper to over-provision capacity than to implement a pricing mechanism to induce more efficient utilization at the margin.").

highspeed access to the Internet have sufficient market power to force users into the cellphone model for Internet access (as well as for the providers' own proprietary content). As more Internet use becomes mobile, this question becomes more focused: on wireless networks, where the cellphone model already operates, will that model become the primary environment for Internet access? Will the dominant wireless carriers have sufficient market power to mandate that users' use of the Internet be "managed" in ways that serve the carriers' bottom lines, no matter what the user might prefer?

D. Nature of the Marketplace

In a competitive market for highspeed Internet access, the price for such access would likely be driven down as access became an indistinguishable commodity, available from a number of sources, and some access would likely be nondiscriminatory. But in the U.S., the wireline market for highspeed Internet access is highly concentrated, and all of the major providers are committed to being able to discriminate in the provision of that access.

Cable and DSL providers control 96% of all residential highspeed Internet access connections in the U.S., and "[i]n nearly every single locality where these two platforms are available, there is just one company providing cable and just one providing DSL."[92] Rural highspeed Internet access is particularly hard to come by.[93] Thus, regional dominant duopoly providers have a tight hold on residential Internet access. Satellite accounts for less than 0.5% of all highspeed Internet access, as does fixed wireless, and mobile wireless accounts for about 2.5% of all highspeed residential connections.[94]

Verizon Wireless and AT&T are the dominant providers of mobile wireless services in most areas of the country. Accidents of history, combined with multiple mergers and the path of cellphone diffusion in this country, have led to this state of affairs.

First, the history. The commercial wireless industry in this country began in 1981 when the FCC issued two free cellular licenses in the 800

92. *See* TURNER, *supra* note 79, at 19; Tessler, *supra* note 15 ("A survey by the Communications Workers of America recently found that median download speeds in the United States stand at 1.9 megabits per second, considerably slower than in other developed countries, particularly those in Asia and Scandinavia.").

93. JOHN B. HORRIGAN & AARON SMITH, PEW INTERNET & AM. LIFE PROJECT, HOME BROADBAND ADOPTION 2007 (2007), *available at* http://www.pewinternet.org/pdfs/PIP_Broadband%202007.pdf (only 47% of American adults have a highspeed Internet connection at home; only 31% of rural Americans have broadband at home).

94. Comments of PISC, *supra* note 5, at 3.

MHz range for each "cellular marketing area" (or "CMA") in the country.[95] There are 734 CMAs in the U.S., and this regulatory limitation to relatively small geographic areas for the licenses (and to only two competitors for each geographic area) meant that cellular technology remained expensive and not widely used.[96] But the operators that were handed these early free "beachfront" 800 MHz licenses retained them, and now (through mergers and sheer staying power) Verizon Wireless and AT&T have most of them.[97]

In this country, most of the people who want a cellphone for voice use have already bought one. In contrast to the market of the 1990s, when carriers were grabbing customers who had never had a cellphone before, the 2007-2008 market is saturated.[98] Now users are on their third or fourth phone and their second or third carrier. The most important service attribute for these experienced cellphone users is coverage—the availability of reliable signals.[99] Verizon Wireless and AT&T offer the best nationwide coverage because they held onto those "beachfront" 800 MHz licenses and snapped up smaller carriers.[100] As a result, Verizon Wireless and AT&T experience both much lower "churn" (dropped subscriptions) and much higher rates of "net adds" (new subscriptions) than the third-largest car-

95. Ted Hearn, *Guarding the Beachfront*, MULTICHANNEL NEWS, June 18, 2007, *available at* http://www.multichannel.com/article/CA6452620.html; Gregory L. Rosston & Andrzej Skrzypacz, *The FCC's 700 MHz Auction*, SIEPR POLICY BRIEF, Dec. 2007, *available at* http://siepr.stanford.edu/papers/briefs/policybrief_dec07.pdf

96. *See* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., Dep't. of Justice, *supra* note 22, at 3.

97. *See* Rosston & Skrzypacz, *supra* note 95. For example, AT&T recently announced that it was buying previously auctioned 700 MHz spectrum from Aloha at a price of $2.5 billion—12 MHz of spectrum covering almost three-quarters of the area of the United States. Grant Gross, *AT&T Buys High-Speed Wireless Spectrum*, MACWORLD, Oct. 9, 2007, http://www.macworld.com/article/60437/2007/10/att.html. This move by AT&T solidifies its spectrum holdings and prevents its competitors (as well as any new entrants) from obtaining this spectrum. Additionally, in just the last six months of 2007, AT&T (Dobson) and Verizon (Rural Cellular/Unicell) each agreed to acquire one of the few remaining independent cellular service providers. Narayan Bhat, *AT&T Completes Acquisition of Easterbrooke*, TMCNET, Jan. 4, 2008, http://internetcommunications.tmcnet.com/topics/broadband-mobile/articles/17660-att-completes-acquisition-easterbrooke.htm.

98. Over 250 million Americans now own a cellphone, for a penetration rate of 82.4%. *See* MERRILL LYNCH, US TELECOM SERVICES INDUSTRY OVERVIEW: US WIRELESS MATRIX 3Q07 (2007); Posting of Mark Hachman to Gearlog, U.S. Cell-Phone Penetration Tops 82 Percent, http://www.gearlog.com/2007/11/us_cellphone_penetration_tops.php (Nov. 13, 2007).

99. *See* Rosston & Skrzypacz, *supra* note 95, at 2.

100. *Id.*

rier, Sprint.[101] Indeed, Sprint is rapidly losing customers.[102] The enormous barriers to entry involved in providing nationwide service, their vast spectrum holdings, and the substantial economies of scale of wireless service generally, make Verizon Wireless and AT&T almost unbeatable oligopolists.[103]

When it comes to highspeed Internet access, current wireless offerings from Verizon Wireless and AT&T do not compete directly in terms of speed or cost with the dominant wireline (DSL, fiber, and cable) transport offerings—which explains why 96% of all residential highspeed Internet access connections are sold by regionally dominant DSL or cable companies.[104] Existing (pre-auction) wireless highspeed Internet access connections cost at least twice as much as a DSL or cable connection, and operate at only a fraction of the speed.[105] Residential highspeed Internet access subscribers simply do not cancel their subscriptions in order to sign up for

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101. *See* Blair Levin, Rebecca Arbogast & David Kaut, *What is the Black Swan of Telecom? (Hint: It's Not the iPhone)*, WASH. TELECOM, MEDIA & TECH INSIDER (Stifel, Nicolaus & Company, Balt., Md.), June 29, 2007. Levin et al. state:

> [T]he power of the two dominant wireless networks, Verizon Wireless and AT&T is growing. They already have about 51% of the subscribers and their share of net customer additions is even larger, 64%. Further, they have just started bundling their wireless services with their other services—a marketing opportunity that their major competitors, Sprint and T-Mobile don't have.

Id. See also Peter Cramton, Andrzej Skrzypacz & Robert Wilson, *Summary: Revenues in the 700 MHz Auction* (June 27, 2007) (unpublished manuscript), *available at* http://www.cramton.umd.edu/papers2005-2009/cramton-skrzypacz-wilson-e-block-plan-increases-revenues.pdf (economist report filed on behalf of Frontline) (finding that Verizon and AT&T had far higher revenues per minute and a much higher number of new subscribers in the fourth quarter of 2006 than their two high-frequency nationwide competitors, Sprint and T-Mobile). *See also* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., Dep't. of Justice, *supra* note 22, at 3 (describing market power of Verizon and AT&T).

102. Steve Lohr, *With Sprint's Client Erosion, Fears of Wireless Slowdown,* NY TIMES, Jan. 19, 2008, at C1.

103. *See* Neil Netanel, *Temptations of the Walled Garden: Digital Rights Management and Mobile Phone Carriers*, 6 J. TELECOMM. & HIGH TECH. L. 77, 96 n.86 (2007) (citing Eli M. Noam, *Fundamental Instability: Why Telecom is Becoming a Cyclical and Oligopolistic Industry*, 18 INFO. ECON. & POL'Y 272 (2006)).

104. WORKING PARTY ON COMMC'N INFRASTRUCTURES & SERVS. POLICY, OECD, DEVELOPMENTS IN FIBRE TECHNOLOGIES AND INVESTMENT (2008), *available at* http://www.oecd.org/dataoecd/49/8/40390735.pdf ("The current range of wireless networks is not capable of offering high bandwidth connectivity, comparable to wired networks."); Comments of PISC, *supra* note 5, at 5 (DSL and cable modem hold 96% of the residential highspeed access market).

105. Comments of PISC, *supra* note 5, at 3-4.

wireless highspeed access via handsets, because these services are not (currently) substitutable.

At the same time, the dominant existing national wireless carriers, AT&T and Verizon, (1) are controlled by *the same* incumbent actors that control DSL access through regional monopolies across the country[106] and (2) offer wireless services as part of packages that tie together traditional phone services, Internet Protocol Television (IPTV) access, and Internet access.[107] In a nutshell, the leaders in mobile wireless are owned by the same companies who control the DSL marketplace and are, like their corporate parents, choosing to avoid direct competition for highspeed Internet access by bundling three or four services together (voice, video, data) and differentiating their offerings based on their voice or video elements.[108] Given this situation, in which 96% of residential wireline highspeed Internet access is provided by regionally dominant DSL or cable companies, and wireless communications are largely provided by two oligopolist

106. *See* Alex Goldman, *Top 23 U.S. ISPs By Subscriber: Q3, 2007,* ISP-PLANET, http://www.isp-planet.com/research/rankings/usa.html (overall market shares of AT&T and Verizon 18.2% and 8.1%, respectively); YUANZHE (MICHAEL) CAI & JAMES KUAI, PARKS ASSOCS., NORTH AMERICAN BROADBAND UPDATE (2008), *available at* http://www.parksassociates.com/research/reports/tocs/2008/broadband-update.htm (broadband market share of AT&T at 21% and Verizon at 13%); S. DEREK TURNER, BROADBAND REALITY CHECK II: THE TRUTH BEHIND AMERICA'S DIGITAL DECLINE (2006), http://www.freepress.net/files/bbrc2-final.pdf (describing regional duopolies controlled by cable and telephone providers). Leichtman Research, as of March 2008, says that these companies have the following numbers of DSL subscribers: AT&T 14,156,000; Verizon 8,235,000; Qwest 2,611,000; Embarq 1,277,000; Windstream 871,400; CenturyTel 555,000; Citizens 523,845. All of these are the local incumbent in their territory, and none has significant out-of-territory subscriber counts. Press Release, Leichtman Research Group, Over 8.5 Million Added Broadband from Top Cable and Telephone Companies in 2007 (Mar. 3, 2008), *available at* http://www.leichtmanresearch.com/press/030308release.pdf.

107. Todd Spangler, *Verizon Debuts Quadruple Play*, MULTICHANNEL NEWS, Jan. 30, 2007, http://www.multichannel.com/article/CA6411417.html (Verizon offering bundle of phone, Internet, TV, and wireless).

108. *See, e.g.*, Posting of DC Truth to Gigaom, Competition Has a Different Meaning in the US, http://gigaom.com/2007/07/12/competition-has-a-different-meaning-in-the-us/#comments (July 12, 2007 12:23 PT) ("Cox and AT&T may appear to be competing, but they don't compete head-to-head on the Internet product, instead focusing on service bundles."); *see also* James S. Granelli, *Phone Bills Are Moving Back Up; Companies Increasingly Are Steering Customers to Bundled Services as a Way to Boost Revenue*, L.A. TIMES, Jan. 28, 2007, at C1. The situation is different in Asia and Europe, where "mobile wireless" providers (particularly in Asia and Europe) have begun offering high-speed transport to the Internet on their cellphone networks. *See* OECD, *supra* note 15 ("An OECD study in 2006 found that nearly 30% of mobile operators offered a flat-rate third-generation (3G) data connection.")

players who are in turn owned by wireline companies, the dominant providers of Internet access services in this country, both wireline and wireless, have ample market power to nudge users towards the proprietary, cellphone, managed model of packetized highspeed communications. These carriers, just like all makers of potentially commodified information goods, have substantial incentives to both lock their customers in with high switching costs and to differentiate their informational offerings from those of other companies running across their network.[109] They obviously also have great incentives to avoid cannibalizing their own wireline highspeed Internet access market dominance.

E. Risks of the Internet Model

The Internet model poses difficulties for the network operators (including wireless carriers) who now provide Internet access. Network operators do not want to be in the position of providing highspeed Internet access to users on a commodity basis. They do not want to be forced into the position of providing neutral highways to the Internet, because their own charged-for, "optimized" services will suffer by competitive comparison.[110] Their basic move is to tie use of their pipes, wires, and spectrum to use of particular charged-for services, like IPTV, cable shows, and proprietary Voice over Internet Protocol (VoIP) applications for which their networks are optimized, and to charge separately for those particular services.[111] All of these network operators are emphasizing their vertically integrated offerings, including streaming video, music, web browsing, gaming, and other similar activities.

The wireless carriers are understandably anxious to avoid any hint of common carriage regulation, on the theory that it will undermine their ability to monetize their networks. They lock in their customers by giving steep (or complete) discounts on handset purchases, requiring that only their authorized handsets be used on their networks, and then bundling these handsets with subscriptions to cellular service.[112] In the wireless world innovation is much slower because carriers pick and choose among

109. *See* Netanel, *supra* note 103, at 78-79; Wilkie, *supra* note 21, at 2 (summarizing economics literature regarding the "incentives of vertically integrated providers to engage in anticompetitive conduct").

110. *See* Susan P. Crawford, *The Internet and the Project of Communications Law*, 55 UCLA L. REV. 359, 395-398 (2007) (describing carrier arguments).

111. *See, e.g.*, Trish Reed, *Phone, Internet, TV, Wireless...Comparing Bundled Services*, EZINE ARTICLES, Feb. 17, 2007, http://ezinearticles.com/?Phone,-Internet,-TV,-Wireless...Comparing-Bundled-Services&id=458373.

112. *Id.* (citing *In re* Bundling of Cellular Customer Premises Equip. & Cellular Serv., 7 F.C.C.R. 4028 ¶ 1 (1992)).

the Internet applications that will be accessible over authorized handsets.[113]

The desires of network operators to vertically integrate their offerings and provide for different treatment of different services (thus keeping non-"optimized" services moving at slow speeds) would not raise legal or business issues in a competitive marketplace. In such a market, some carrier or network operator would emerge who would be willing to provide non-prioritized, commoditized—Internet model—transport services. Such a market, however, does not yet exist here. The cellphone model of Internet access appears destined to prevail because of the market power of the dominant providers of Internet access and their (to date) successful defeat of regulation or legislation that would nudge them into Internet-model behavior.

IV. THE 700 MHZ AUCTION

The 700 MHz auction was designed to sell off licenses to valuable beachfront spectrum that television broadcasters have been forced to relinquish. The auction was born in controversy and created enormous controversy in every corner of the U.S. communications industry. This Part explains the story behind the auction, describes the changed technical and business background against which current spectrum policy is operating, and briefly outlines the positions of key players.

A. The Story Behind the Auction

1. The Broadcasters and Their Spectrum

In the 1980s, large commercial television broadcasters faced two enemies: cable systems and two-way radios. Cable systems were siphoning off the audience for television broadcasts, and manufacturers of two-way radios were pointing out to the FCC that the broadcasters were not using much of their allocated spectrum.[114] The broadcasters came up with the bright idea of demanding *even more* spectrum in order to provide "high definition" digital television to their audience.[115] Congress went along with this notion, and decided in the early 1990s to allow every television station to apply for a second channel for temporary use in the transition to high definition digital transmissions.[116] Congress also determined that

113. *See* Wu, *supra* note 80.

114. JOEL BRINKLEY, DEFINING VISION: THE BATTLE FOR THE FUTURE OF TELEVISION 6-8 (1997).

115. *Id.* at 10.

116. Every television broadcaster was given a second 6 MHz spectrum license. The

when the transition was complete this second channel would be auctioned off.[117] For the last fifteen years or so, Congress has been counting on the billions of dollars that will be generated from this auction.[118]

Although this story sounds simple, there have been many painful delays along the way. Broadcasters were delighted to fend off the anticipated loss of "their" spectrum to land mobile operators, but they were less pleased when they realized they would have to buy expensive equipment in order to provide digital television transmissions. The date of the digital transition has been extended again and again, as the broadcasters argued that not all consumers were ready to lose access to over-the-air analog television transmissions.[119]

In early 2006, Congress passed the Digital Television Transition and Public Safety Act, which sets a hard date for the digital transition—February 19, 2009, chosen in part because it falls after the Super Bowl is over—and provides that some of the revenues from the auction of spectrum will be used to fund coupons for digital-to-analog converter boxes.[120] On that day in February 2009, if there are no further delays, analog television transmissions will cease and all television broadcasting will be digital. The broadcasters are obligated to "clear the band" and release the 108 MHz of spectrum (the temporary channels they were allocated to accom-

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Commission and Congress expected that broadcasters would offer both analog and digital transmissions during a transition period. Then, when enough consumers were receiving digital signals, the plan was that the broadcasters would cede their analog frequencies and move to enhanced digital programming. *See* Notice of Proposed Rulemaking, *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, FCC 04-113, ¶ 4 (Fed. Commc'ns Comm'n May 25, 2004), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-113A1.doc [hereinafter White Spaces NPRM].

117. *Id.* The broadcasters have been forced off channels 52 to 69, which correspond to 698-806 MHz—hence the nickname "700 MHz auction."

118. BRINKLEY, *supra* note 114, at 321.

119. Although the initial deadline for giving back the analog spectrum was 2006, Congress modified the deadline to allow television stations to use both analog and digital transmissions until there was 85% penetration of digital signals in households in their markets. *It's Crunch Time for Congress on DTV Transition*, TELECOM POLICY REPORT, May 30, 2005 (describing sequence of events). This very uncertain standard triggered several extensions of the auction.

120. The auction must begin by January 28, 2008, money must be deposited in the Treasury by June 30, 2008, and analog transmissions must cease on February 19, 2009. *See* Report and Order and Further Notice of Proposed Rulemaking, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150, FCC 07-72, ¶ 2 (Fed. Commc'ns Comm'n Apr. 27, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-72A1.pdf [hereinafter Further Notice of Proposed Rulemaking]. This schedule, and the February 19 date in particular, is often referred to as the "digital transition," or the "DTV transition."

plish the digital transition) by that date.

Thus, after more than twenty years of tumultuous debate over how and when to reclaim this broadcasting spectrum, the auction went forward in January 2008, resulting in key large wins by Verizon and AT&T.[121] There remain key uncertainties: will the broadcasters actually vacate the airwaves by February 2009? Will consumers be ready for the digital television transition?[122] Will a disappointed player sue to enjoin the implementation of the auction's results?

2. The Subject of the Auction

The spectrum that will be returned, and was therefore auctioned off, is between channels 52 and 69—previously the "ultra high frequency" television area. There was great interest in this spectrum in part because of its characteristics. Radio waves at lower frequencies like these are generally thought to propagate better, across greater distances.[123] In particular, the

121. *See supra* text accompanying note 24.

122. The digital transition has been spurred on by the digital tuner rule, which requires all new televisions to include the capability of receiving digital broadcasts. *See* Werbach, *supra* note 66, at 58-60 (describing digital tuner mandate). But many Americans (perhaps 70 million) still have analog television sets; if the owners of these sets are not subscribers to cable or satellite systems, the sets will cease to receive any television broadcasts on February 19, 2009. *See* David Hatch, *Media Expert Predicts Digital 'Train Wreck'*, TELECOM DAILY, July 19, 2007 (noting objections to "poorly-funded outreach effort" to consumers about converters). As J. H. Snider points out, however, "[t]he vast majority of TV sets are used primarily for purposes other than watching TV terrestrially over-the-air." SNIDER, ART OF SPECTRUM LOBBYING, *supra* note 10, at 26.

123. The claim that any one frequency is "better" than another for propagation purposes has been strenuously attacked on technical grounds. *See* Posting of David P. Reed, dpreed@reed.com, to arch-econ@cookreport.com (June 29, 2007) (on file with author). Reed stated that:

> [W]hat people call problems with propagation at 5.8 GHz are really results of receiver and system design choices: small antennas, high-data rate service, wideband modulation, very low power limits. what people call the strengths of 700 MHz are really the results of receiver and system design choices: large antennas way up high on towers, low data rate services, narrowband modulations, very high power limits.

Id. The claim that 700 MHz is inherently "better," however, unquestionably reflects the current received wisdom (even if it is incorrect). *See, e.g.*, Report and Order and Further Notice of Proposed Rulemaking, *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, FCC 07-72 (Fed. Commc'ns Comm'n Apr. 27, 2007) (statement of Comm'r Deborah Tate), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-07-72A5.pdf. Tate stated:

> The inherent propagation characteristics of the 700 MHz band could make it less expensive to construct new networks covering larger geographic areas, making it ideal for expanding the availability of broadband in rural areas. At the same time, the band potentially provides bet-

700 MHz band is generally considered to be ideal for services that need to cover a large area that may include trees and walls, and is more likely to work for transmission services in adverse weather conditions.[124] Current cell phone and Wi-Fi services cover much smaller areas and rely on line-of-sight transmissions. This 700 MHz spectrum might therefore be able to support long-range provision of wireless highspeed Internet access (1) in areas where faster "wired" DSL or cable Internet access is not available, or (2) for personal, portable wireless uses.[125] It might be able to do this while requiring far less capital expenditure for the building of transmission towers than higher frequency bands.[126] Until this auction, the spectrum was available only for analog television broadcasts; now it is being earmarked for broadly defined wireless "Commercial Mobile Radio Services" (CMRS) uses.[127]

There was enormous, front-page-story interest in this 700 MHz spectrum because nearly all the usable radio-frequency spectrum has been fully allocated by the FCC.[128] Wide ranges of frequencies are assigned to the military, broadcasters, emergency services, and other users. Even though these frequencies may not be in use, they are unavailable for new uses.[129] The FCC has also imposed restrictions on *how* particular frequencies may

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> ter in-building coverage than higher frequencies, which not only would facilitate the provision of advanced services in urban areas but also could help improve 911 access and location system performance.

Id.

124. Blair Levin, Rebecca Arbogast & David Kaut, *700 MHz: A Pivotal Auction,* WASH. TELECOM, MEDIA & TECH INSIDER (Stifel, Nicolaus & Company, Balt., Md.), Mar. 2, 2007.

125. *See infra* Section IV.A.1 (describing limitations of 700 MHz spectrum).

126. Kanchana Wanichkorn & Marvin Sirbu, *The Role of Fixed Wireless Access Networks in the Deployment of Broadband Services and Competition in Local Telecommunications Markets,* Telecommunications Policy Research Conference, 2002, at 23, *available at* http://intel.si.umich.edu/tprc/papers/2002/86/FixedWirelessNetworks.zip (system operating at 2.6GHz would need twice as many cell sites as system operating at 700 MHz).

127. *See* Second Report and Order, *supra* note 1, ¶ 1 ("This spectrum currently is occupied by television broadcasters in TV Channels 52-69. It is being made available for wireless services, including public safety and commercial services, as a result of the digital television ('DTV') transition.").

128. GENERAL ACCOUNTING OFFICE, PUBL'N NO. GAO-02-906, BETTER COORDINATION AND ENHANCED ACCOUNTABILITY NEEDED TO IMPROVE SPECTRUM MANAGEMENT (2002), *available at* http://www.gao.gov/new.items/d02906.pdf.

129. *See* Shared Spectrum Co., Spectrum Occupancy Measurements, http://www.sharedspectrum.com/measurements (study showing that actual spectrum utilization in any given geographic area averages only 5% of total available spectrum).

be used, in addition to *who* may use it.[130] Thus, spectrum is scarce as a practical matter.[131] The 700 MHz auction was widely described as the last great auction of spectrum for the foreseeable future.[132] Because the ten-year licenses granted by the FCC are perpetual as a practical matter, the stakes were high.[133] This auction was thus a central policy moment for the United States and a useful case study for telecommunications policy generally.

3. *The Statutory Scheme and the Band Plan*

Section 301 of the 1934 Telecommunications Act states that the federal government controls the electromagnetic spectrum in this country.[134]

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130. This method of allocating spectrum is often referred to as the "command and control" model, under which the Commission "allocates and assigns frequencies to limited categories of spectrum users for specific government-defined uses. Service rules for the band specify eligibility and service restrictions, power limits, build-out requirements, and other rules." SPECTRUM POLICY TASK FORCE, FED. COMMC'NS COMM'N, REPORT OF THE SPECTRUM RIGHTS AND RESPONSIBILITIES WORKING GROUP (2002), *available at* hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228542A1.pdf [hereinafter SPTF-RR].

131. Many have argued that making more spectrum available on an unlicensed basis and relying on "smart" devices to isolate particular transmissions could solve most perceived scarcity problems, and that in fact no real scarcity exists. *See, e.g.*, Yochai Benkler, *Some Economics of Wireless Communications*, 16 HARV. J.L. & TECH. 25 (2002) [hereinafter Benkler, *Wireless Communications*]; Benkler, *supra* note 50; David Weinberger, *The Myth of Interference,* SALON, Mar. 12, 2003, http://dir.salon.com/story/tech/feature/2003/03/12/spectrum/index.html (quoting David Reed saying that "There's no scarcity of spectrum any more than there's a scarcity of the color green."). Because Congress has decided that this 700 MHz spectrum must be auctioned off, dedicating it to unlicensed use is not an option. The argument that more spectrum should be made available on an unlicensed basis remains relevant, however, in the context of the white spaces proceeding described *infra* in Section VI.B. In a larger sense, as Benkler notes, "cumulative institutional choices [have] caused spectrum scarcity, rather than responded to it," and these choices can be changed in the context of the white spaces. Benkler, *supra* note 50, at 300.

132. *See, e.g.*, Levin et al., *supra* note 124.

133. *See* MOORE, *supra* note 10, at 7 ("Even though licenses must be renewed periodically, it is generally understood that license winners will be able to keep the license perpetually, as long as they comply with FCC service rules."); *see also* Eli Noam, *Spectrum Auctions: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access*, 41 J.L. & ECON. 765, 785 (1998).

134. 47 U.S.C. § 301 (2000); Robert Matheson & Adele Morris, The Technical Basis for Spectrum Rights (2007) (unpublished manuscript, on file with author) ("The term 'spectrum' is used colloquially to mean several things, including a given frequency, a frequency band, or a set of rights to access a set of frequencies at a given time and location.").

For the purposes of this Article, "spectrum" is shorthand for "rights to use particular frequencies."

The government is to permit "the use of such channels, but not the ownership thereof, by persons for limited periods of time, under licenses granted by Federal authority."[135] The resulting license is for long-term usage and does not establish an ownership right, but as a practical matter it is permanent.[136] In 1983, Congress inserted into the 1934 Act the statement that it is the policy of the United States "to encourage the provision of new technologies and services to the public," and that anyone who opposes a new technology or service will have the burden of demonstrating that the proposal is inconsistent with the public interest.[137]

Spectrum was initially handed out through comparative hearings, with their "heavy-handed political influence peddling"[138] and "socially wasteful and politically charged" atmosphere.[139] The next step was towards lotteries, for which hopeful and deluded applicants overloaded the floors of the FCC with paper while well-connected Americans received windfalls.[140] After a flurry of Clinton Administration interest in auctioning spectrum, Congress amended Title III of the 1934 Act in 1993 to authorize the Commission to assign licenses through competitive bidding.[141] Auctions

135. 47 U.S.C. § 301 (2000).

136. *See supra* note 133. The licenses at issue in the 700 MHz auction are nominally for ten-year terms, terminating on February 17, 2019. Second Report and Order, *supra* note 1, ¶ 35.

137. 47 U.S.C. § 157(a) (2000); *see also* 47 U.S.C. § 303 (2000) (if "the public convenience, interest, or necessity requires[, the Commission] shall . . . (r) . . . prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this chapter"). The Commission cites *Schurz Communications, Inc. v. FCC* for the proposition that the "Communications Act invests [the] Commission with 'enormous discretion' in promulgating licensee obligations that the agency determines will serve the public interest." Second Report and Order, *supra* note 1, ¶ 207 n.470 (citing Schurz Comm'cns, Inc. v. FCC, 982 F.2d 1043, 1048 (7th Cir. 1992)).

138. Nicholas W. Allard, *The New Spectrum Auction Law*, 18 SETON HALL LEGIS. J. 13 (1993). Comparative hearings were used between 1927 and 1984.

139. Thomas W. Hazlett, *Assigning Property Rights to Radio Spectrum Users: Why Did FCC License Auctions Take 67 Years?*, 41 J.L. & ECON. 529, 530 (1998).

140. *See* Allard, *supra* note 138, at 26. Lotteries were used between 1984 and 1994 to assign cellular licenses. Hazlett, *supra* note 139, at 533. Hazlett asserts that "public interest" considerations faded when licenses were adopted, because "[t]here were no program content issues at stake." *Id.* at 560; *see* SNIDER, ART OF SPECTRUM LOBBYING, *supra* note 10 (documenting outrage over lotteries). For a description of the history of the auction requirement, see NUECHTERLEIN & WEISER, *supra* note 39, at 242-51.

141. Omnibus Budget Reconciliation Act of 1993 (OBRA 1993), Pub. L. No. 103-66, § 6002, 107 Stat. 312, 387-92 (codified as amended at 47 U.S.C. § 309(j)). In the Balanced Budget Act of 1997, Congress expanded the Commission's auction authority, provided for the transfer of additional spectrum from federal government use and granted the Commission explicit authority to allocate electromagnetic spectrum so as to provide flexibility of use. Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251

are said to move spectrum quickly to the players that value these resources most highly and to create rational certainty and investment incentives, and were adopted to reduce budget deficits.[142] Indeed, Congress has *required* the FCC to use auctions if, among other things, the service to be provided using the spectrum involves the sale of communications services to subscribers.[143] Initial Congressional auction authority was explicitly linked to Personal Communications Services (PCS) allocations, accompanied by heady claims of supplanting existing communications modalities.[144]

The Commission's job is to determine "whether the public interest, convenience, and necessity will be served by the granting" of particular licenses pursuant to auction.[145] Over the years, the Commission has considered any number of "public interest" factors, and has been assailed for its ad hoc, band-by-band approach to spectrum policy.[146] In the auction setting, however, Congress did provide guidelines for the "public interest" standard for competitive bidding for licenses, instructing the FCC to promote economic opportunity, competition, and development and deployment of new technologies; to avoid excessive concentration of licenses and spread licenses among a wide variety of applicants; and to promote efficient and intensive use of spectrum.[147]

(1997). *See also In re* Implementation of Section 309(j) of the Commc'ns Act, 9 F.C.C.R. 2348 (1994).

142. *See* Noam, *supra* note 133, at 771.

143. *See* Peter Passell, *Economic Scene; Auctioning Off The Airwaves Will Be a Formidable Undertaking*, N.Y. TIMES, Apr. 7, 1994, at D2 (quoting former FCC official saying that "'[a]n auction is bound to be better than the alternatives' of giving away licenses by lottery or awarding them to the best lobbyists").

144. *See* Hazlett, *supra* note 139, at 560-61 (noting that PCS was to be licensed as a competitor to existing cellular services and "was anticipated to be of substantial social value."); *see also* Edmund L. Andrews, *America Unplugged: Entering a Wireless Era—A Special Report; F.C.C. Clearing Airwaves For Phones of the Future*, N.Y. TIMES, Sept. 20, 1993, at A1. Andrews reported that:

> Using the digital electronics of computers, the new 'personal communications services' will be capable of sending data, images and perhaps even video to an expanding family of nomadic computing devices—palm-size computers, electronic notepads and what some people call mutant devices that combine the features of a telephone, computer and pager. . . "This will shake the foundations of the entire telecommunications industry," remarked Alfred C. Sikes, who served as the chairman of the F.C.C. under President George Bush. . . .

Id.

145. 47 U.S.C. § 309(a) (2000).

146. SPTF-RR, *supra* note 130, at 8.

147. 47 U.S.C. § 309(j)(3)(A)-(B) (2000). Among the objectives of Section 309(j) of the Act are "the development and rapid deployment of new technologies, products, and

In connection with the 700 MHz auction, Congress had allocated 24 MHz of the available formerly analog-broadcast spectrum for "public safety" uses.[148] The rest of the spectrum in this 700 MHz chunk had been statutorily allocated for broadly defined "commercial wireless" uses.[149] Congress has not said what the geographic scope of these commercial licenses should be, so the FCC had discretion to decide which licenses should be national in scope and which should be of other sizes—regional, cellular market area, etc.[150] The FCC also had discretion to set other rules about buildout requirements (how much area a licensee's network must cover), "open access" requirements, wholesale versus retail operations, and cooperation (or not) with public safety officials by commercial operators.[151]

The statute states that the absolute auction revenue to be received may not be the basis of a Commission finding that the public interest has been served.[152] The Commission has said that it understands this provision to mean that "[r]adio spectrum is a public resource of the United States that Congress has authorized and directed the Commission to manage in the public interest," with the Commission's "most basic spectrum-management power [being] to assign spectrum to achieve public interest benefits other than monetary recovery."[153]

In connection with adopting the specific 700 MHz auction rules that are the subject of this Article, the Commission established the "band plan" for the spectrum to be auctioned—the number of MHz for each block and

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services for the benefit of the public, including those residing in rural areas;" "promoting economic opportunity and competition and ensuring that new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women;" and the "efficient and intensive use of the electromagnetic spectrum." *Id.*

148. *See* Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 251 § 3004 (codified as amended at 47 U.S.C. § 337(a) (2000)).

149. 47 U.S.C. § 309(j)(14)(C)(i)(II) (2000).

150. A few abbreviations used by the Commission for the geographic size of licenses: REAG means "regional economic area grouping" (there are only 12 of them); MEA means "major economic area" (there are 52 of them); EA means "economic area" (there are 176 of them); CMA means "cellular market area" (there are 734 of them). Further Notice of Proposed Rulemaking, *supra* note 120, ¶ 18.

151. 47 U.S.C. § 309(j)(3) (2000 & Supp. IV).

152. 47 U.S.C. § 309(j)(7)(A) (2000).

153. SNIDER, ART OF SPECTRUM LOBBYING, *supra* note 10, at 12 (citing *In re* Improving Public Safety Commc'ns in the 800 MHz Band, 19 F.C.C.R. 14969, ¶ 85 (Aug. 6, 2004)).

the geographic extent of the licenses to be awarded for each block.[154] As shown in Table 1, the 700 MHz band is divided into two categories—the lower 700 MHz band and the upper 700 MHz band. This Article focuses on the "service rules" for two of the upper band blocks: the upper band "C" block, in which two nationwide paired blocks of 11 MHz each were auctioned off in very large geographic areas—12 licenses, each covering a "Regional Economic Area Grouping"—and the upper band "D" block, in which a single nationwide license was to be auctioned off accompanied by an obligation to construct a public safety network.

Band	Frequency Block	Bandwidth	Geographic Area Type	Number of Licenses
Lower 700 MHz	A	12 MHz	EA	176
Lower 700 MHZ	B	12 MHz	CMA	734
Lower 700 MHz	E	6 MHz	EA	176
Upper 700 MHz	C	22 MHz	REAG	12
Upper 700 MHz	D	10 MHz	Nationwide	1
Auction Total		62 MHz		1,099

Table 1: EA–"Economic Area"; CMA–"Cellular Market Area"; REAG–Regional Economic Grouping"

The Lower 700 MHz band commercial licenses were set up in small geographic areas and designed to facilitate the entry of smaller businesses into local competition in wireless provision. The C and D commercial blocks in the upper band were the focus of attention because they made possible the entry of a nationwide competitor.

B. Key Perspectives

This Section describes the positions of the FCC, Congress, the incumbent spectrum holders (Verizon Wireless and AT&T), and new spectrum entrants (including, most prominently, Google) with respect to the auction of the Upper Band C block.

1. FCC: The Purpose of the Auction

What did the FCC think was the purpose of the 700 MHz auction? The FCC's rhetoric suggested that the Commission actually believed that the

154. Second Report and Order, *supra* note 1, ¶ 4 (setting out band plan).

auction could provide an opportunity for competitive choice in the market for highspeed Internet access—thus facilitating greater highspeed access penetration, higher speeds, and lower prices. For example, Chairman Kevin Martin said that the auction "presents the single most important opportunity" for the U.S. to facilitate the deployment of a third choice (sometimes called the "third pipe"), in addition to cable and DSL networks, for highspeed Internet access.[155] He repeatedly maintained that improving highspeed access to the Internet was a key priority for the Commission.[156]

It was not clear how a competitive nationwide "third pipe" could have emerged from the auction, however, given the data limits for the limited spectrum made available in a single block in the 700 MHz auction. Highspeed Internet access using the two 11-MHz blocks of 700 MHz spectrum being auctioned off as "Block C" would not be very highspeed, and Block C was the largest block being auctioned.[157]

It was true, however, that the favorable propagation characteristics of this spectrum (long distances, penetration through foliage and building walls) could have been very useful in making cost-effective last-mile

155. Notice of Proposed Rulemaking, *In re* Development of Nationwide Broadband Data, WC Docket No. 07-38, FCC 07-17 (April 16, 2007) (statement of Kevin J. Martin, Chairman), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-17A4.pdf.

156. *See, e.g., id.* at 49 (promoting broadband deployment and penetration is one of his highest priorities); *Oversight of the Federal Communications Commission: Hearing Before the Subcomm. On Telecomm. and the Internet of the S. Comm. on Commerce, Science and Transportation*, 110th Cong. (2007) (statement of Kevin J. Martin, Chairman, FCC) (broadband deployment and penetration is a critical link to economic growth), *available at* http://commerce.senate.gov/public/_files/MartinSenateTestimony121307final.pdf, at 3.

157. STEVE METHLEY, PUBL'N NO. SES-2006-9, WIRELESS LAST MILE FINAL REPORT (2006), *available at* http://www.ofcom.org.uk/research/technology/research/ese/lastmile (follow "Wireless Last Mile Final Report" hyperlinks). One can transmit approximately two bits of information (or less) per each Hertz. So 11 MHz (the amount available in each Block C regional license) would provide about 15 Mbps of capacity, which is spread over a cell. The actual speed experienced by a customer in that cell, however, will be approximately 2 Mbps for downloads, and probably less. That is approximately the speed of DSL or cable service now. As DSL and cable providers "eventually increase speeds to 5-10 Mbps of throughput for each user, that wireless service will not be a true competitor. It will be a reasonable broadband experience for a wireless device used for limited applications, but it will not be a substitute for a residential wireline connection." *See* Posting of John to Lafayette Pro Fiber Blog, Cheap Wi-Fi Is Too Slow, http://afayetteprofiber.com/Blog/2007/06/cheap-wi-fi-too-slow.html (June 19, 2007). *Cf.* Second Report and Order, *supra* note 1, ¶ 77 (stating that standards groups do not expect highspeed data rates with less than a 20MHz block).

Internet access available to rural areas underserved by wireline or wireless Internet access providers. This 700 MHz band (Upper Band Block C) of spectrum could have provided wireless Internet access at less expense (given the lower numbers of towers needed) than existing wireless services, in areas to which DSL and/or cable modem access had not yet been extended—with the added advantage of mobility. For rural areas, this could have been a way around the DSL/cable bottleneck.

Nonetheless, the Commission's broad rhetoric continued, with Chairman Martin in particular apparently anxious to talk about the possible merits of a "third pipe" wireless solution stemming from the auction. The reason? To the extent that the U.S. has a policy direction for facilitating the continued penetration of highspeed Internet access, it has been focused on supporting the idea that competition between the two existing dominant platforms—cable and DSL providers—will generate a competitive marketplace. Chairman Martin was extending the logic of this policy direction to include a third option—wireless—on the assumption that the presence of a third actor would make a difference. His stated hope was that the operation of market forces would obviate the need for regulation.[158]

This "intermodal" approach (facilitating competition between platforms) to encouraging broadband penetration differs from the policies of many other countries. In the UK, for example, British Telecom has been required to set up a separate organization (Openreach) which sells wholesale transport services to independent ISPs.[159] Broadband speeds have

158. Verizon and AT&T are also implementing fiber-optic communications networks, and Verizon in particular has made substantial progress in this direction. But Verizon's fiber-optic network (FiOS), which delivers speeds of up to 20 Mbps, is available to only about 8.5 million homes and businesses in 16 states, out of approximately 110 million households nationwide, a penetration rate of less than 10%. The actual number of FiOS subscribers is far lower. *See* Press Release, Verizon, Verizon Continues to Dramatically Raise Broadband Upload Speeds in FiOS Internet Service Areas (Nov. 20, 2007), *available at* http://newscenter.verizon.com/press-releases/verizon/2007/verizon-continues-to.html; U.S. Census Bureau, USA QuickFacts from the US Census Bureau, http://quickfacts.census.gov/qfd/states/00000.html (Data as of 2000). The much-touted FiOS network so far reaches only 515,000 homes (instead of the 12 million originally projected for 2000), offers usually only five-Mbps service, and costs about the same as 100Mbps service available in Korea. Tessler, *supra* note 15. Five-Mbps speed is not enough to "reliably deliver high-definition video online." *Id.* AT&T only has 51,000 IPTV customers, although it claimed it would have 18 million by 2007. E-mail from Bruce Kushnick, Chairman of Teletruth.org, to author (Aug. 1, 2007, 04:22) (on file with author).

159. Press Release, Office of Commc'ns [Ofcom], Ofcom Accepts Undertakings From Board of BT Group plc on Operational Separation (Sept. 22, 2005), *available at* http://www.ofcom.org.uk/media/news/2005/09/nr_20050922 (describing access structure

doubled, and the number of highspeed Internet access subscriptions has climbed sharply.[160] In France, France Telecom was forced to open up its network to rival operators. That encouraged competitors to rent access to France Telecom's wires and start offering competing broadband services. And that, in turn, encouraged France Telecom to improve its own prices and services. Now France is "one of the world's most wired nations."[161] Japan's government required the largest phone company in Japan to open up its wires to competitive Internet access providers.[162] The ensuing competition drove that company (Nippon Telegraph and Telephone) to implement its own highspeed Internet access plans and install optical fiber networks nationwide. At the moment, access speeds in Japan are up to 17 times faster than those in the US.[163] Similarly, in Korea, extensive government involvement in policy-setting, investment, and loan programs has led to the fastest and most prevalent Internet access in the world.[164]

In the U.S., adding (slow) "wireless" to "DSL" and "cable" will not substantially change the competitive picture for highspeed Internet access. First, the reality is that the "intermodal" approach has been a failure in this country. Because both sets of existing Internet access providers—DSL and cable—are resisting commodification by selling bundles of proprietary services (to which Internet access is an add-on), they are not directly competing to offer "naked" highspeed Internet access.[165] Both sets of providers object to any requirement that they sell wholesale, nondiscriminatory transport to competitive retail providers of Internet access.[166] Both sets of providers want to be able to extract all possible consumer surplus out of their cables and wires by charging differentially for favored uses of their

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to be operated by BT in the United Kingdom).

160. Sarah Laitner, *Reding Drops a Broadband Bombshell*, FINANCIAL TIMES, Aug. 30, 2007, at 6.

161. Jennifer L. Schenker, *Vive la High-Speed Internet!*, BUSINESSWEEK, July 18, 2007, http://www.businessweek.com/globalbiz/content/jul2007/gb20070718_387052.htm.

162. Nobuo Ikeda, *How the 'Japanese Miracle' of Broadband Came About*, GLOCOM PLATFORM, Dec. 24, 2003, *available at* http://www.glocom.org/special_topics/colloquium/20031224_ikeda_how/.

163. Blaine Harden, *Japan's Warp-Speed Ride to Internet Future*, WASH. POST, Aug. 29, 2007, at A02.

164. Posting of Karl to Broadband Reports.com, South Korea Wants to Stay Broadband King, http://www.dslreports.com/shownews/South-Korea-Wants-To-Stay-Broadband-King-87926 (Sept. 27, 2007).

165. *See* text accompanying notes 106-108 (describing Verizon bundled services.)

166. *See* Ted Hearn, *Court Agrees with FCC on DSL Deregulation*, MULTICHANNEL NEWS, Oct. 16, 2007, http://www.multichannel.com/article/CA6491979.html (noting that deregulation of telcos provides parity with cable companies).

networks.[167] Second, the addition of a drip of wireless Internet connectivity, even if provided by a new nationwide entrant, will not threaten the dominance of DSL and cable or encourage the penetration of highspeed Internet access services through competition. Indeed, the comparatively slow wireless Internet connectivity made possible through the auction of two 11-MHz blocks cannot compete with DSL and cable speeds in areas where wireline Internet access is already available.

But the idea of "intermodal" competition fits with the Commission's generally deregulatory stance.[168] The Commission gave the appearance of facilitating such competition through its approach to the 700 MHz auction. Even though the emergence of a real "third pipe" through the workings of the auction was highly unlikely, the Commission's rhetoric suggested that that was what they had wanted all along.

2. Congress's Budgetary Needs

In creating the rules for the 700 MHz auction, the Commission was responding to a Congressional mandate and continuing Congressional pressure. Congress's plan was that the auctioned spectrum would go to the highest bidder, with the resulting auction proceeds subsidizing both digital converter boxes for consumers and a national public safety wireless network.[169] In addition, over $7 billion from the auction revenues will go towards deficit reduction.[170] The Congressional Budget Office estimated that the commercial license of 60 MHz of spectrum in the 700 MHz auction will bring in $10-$15 billion,[171] and other estimates ranged even

167. *See, e.g.*, Susan P. Crawford, *supra* note 110; *see also* Jon Leibowitz, Comm'r, FTC, Concurring Statement Regarding the Staff Report Broadband Connectivity Competition Policy, *available at* http://www.ftc.gov/speeches/leibowitz/V070000statement.pdf. Commissioner Leibowitz cautioned:

> There is a real reason to fear that, without additional protections, some broadband companies may have strong financial incentives to restrict access to content and applications. . . . There is little agreement over whether antitrust, with its requirements for *ex post* case by case analysis, is capable of fully and in a timely fashion *resolving* many of the concerns that have animated the net neutrality debate.

Id. at 1-3.

168. *See, e.g.*, Jim Hu, *New FCC Chairman Bullish on Deregulation*, CNET NEWS.COM, Apr. 5, 2005, http://www.news.com/New-FCC-chairman-bullish-on-deregulation/2100-1034_3-5655643.html.

169. *See* Implementation of Section 309(j) of the Communications Act—Competitive Bidding, PP Docket No. 93-253, Second Report and Order, 9 F.C.C.R. 2348 (1994).

170. Deficit Reduction Act of 2005, Pub. L. No. 109-171, 120 Stat. 21 (codified as amended at 47 U.S.C. § 309).

171. John Dunbar, *Auction May Not Be a Boon for Consumers*, ASSOCIATED PRESS, July 30, 2007, *available at* WestLaw, 7/30/07 APWIRES 22:07:29.

higher.[172] Even though the Iraq and Afghanistan wars cost $16 billion a month,[173] Congress is always interested in publicizing its abilities to find additional sources of funds—no matter how insignificant. Two Commission staff members anonymously told the *Washington Post* that "[e]nsuring that the deep-pocketed carriers pay top dollar for the spectrum is a high priority for FCC commissioners because the auction proceeds have already been allocated by Congress."[174] Notwithstanding its statutory admonition against equating the "public interest" with "revenues received,"[175] Congress was deeply interested in getting the most money it could out of this auction. In the event, the final auction revenue amounted to approximately $19 billion—with more than 84% of it coming from Verizon and AT&T as winners of large blocks of spectrum.[176]

3. Access Entrants' Needs

For new entrants into the wireless Internet access industry, the mere presence of Verizon Wireless and AT&T as bidders for upper band blocks C and D posed substantial problems. For Verizon and AT&T, the argument went, the value of keeping other bidders from winning this spectrum would exceed the spectrum's market value. Economists have suggested that incumbents in such a situation will be willing to pay "whatever it takes" to win the auction, because their top priority is blocking new en-

172. *See, e.g.*, Posting of Harold Feld to Wetmachine, 700 MHz Endgame: Has AT&T Asked Bush To Put Thumb on Scale?, http://www.wetmachine.com/totsf/item/850 (July 13, 2007) (mentioning a projection of $20 billion in revenue).

173. *See* Bill Adair, *The Iraq War, for $100 A Month,* POLITIFACT.COM, Apr. 1, 2008, http://www.politifact.com/truth-o-meter/article/2008/apr/01/iraq-war-100-month/ (confirming Obama claim that Iraq war costs $100/household/month, or $16 billion).

174. Kim Hart, *How to Sell the Airwaves,* WASH. POST, July 13, 2007 (citing "two commission staff members who spoke on the condition of anonymity because they are not authorized to speak publicly on the matter."); *see also* Kim Hart, *FCC Majority Backs Open-Access Plan for Airwaves*, WASH. POST, July 25, 2007 (noting that Republican legislators "say the auction should be free of conditions—in part because rules could reduce the revenue it generates, which is expected to be about $15 billion."); Grant Gross, *Republican Lawmakers Protest Spectrum Plan*, INFOWORLD, July 24, 2007, http://www.infoworld.com/article/07/07/24/Republican-lawmakers-protest-spectrum-plan_1.html ("'Congress has already spent that [spectrum auction] money,' said Representative Charles Gonzalez, a Texas Democrat.") FCC Chairman Martin's own Top Ten Predictions for the 700 MHz Auction, jokingly presented at the December 2007 Chairman's Dinner, included the following entry: "#6. Congress will spend the auction receipts 10 times over before we cash the [winning bidders'] checks." Blair Levin, Washington Telecom, Media & Tech Insider 2007 Awards, Dec. 21, 2007, at 6.

175. *See* 47 U.S.C. 309(j)(7) (2000).

176. Posting of Kim Randolph to BIA Perspectives, Auction 73 Results—700 MHz Spectrum, *available at* http://blog.bia.com/bia/?p=24 (Mar. 28, 2008).

trants rather than paying the market price for spectrum.[177] The stakes were particularly high for Verizon and AT&T in the 700 MHz auction because the central choice between models for Internet access was in play; a new nationwide entrant that was successful in providing the Internet model of Internet access (nondiscriminatory, commoditized transport) would provide a competitive proof of concept that might be embraced by users—thus undermining the incumbents' business plans. The foreclosure value from these incumbents' perspectives for the 700 MHz spectrum was therefore arguably even higher than it might have been in another, non-nationwide spectrum auction.[178]

Accordingly, prospective access entrants argued for bidding credits for designated entities and entrepreneur bidders,[179] blind bidding,[180] spectrum caps,[181] the exclusion of large wireless incumbents from the auction en-

177. Gregory Rose, *Spectrum Auction Breakdown: How Incumbents Manipulate FCC Auction Rules to Block Broadband Competition* 16 (New Am. Found., Working Paper No. 18, 2007) (noting that, in prior auction, "the major incumbents were apparently willing to pay a significant premium for engaging in [a] blocking bidding strategy: on average, they paid 2.5 times more for the spectrum which they acquired than bidders who did not engage in this strategy").

178. "Foreclosure value" is the loss of an incumbent's oligopoly rents were an entrant to win that license. Cramton et al., *supra* note 101, at 3.

179. *See* Comments of Frontline Wireless, LLC, *In re* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, at 67 (Fed. Comm'cns Comm'n May 23, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519415226. The FCC provides that "designated entities" may obtain bidding credits in auction settings. 47 C.F.R. § 1.2110(b)(3)(iv)(A) (2007); *see* Catherine J.K. Sandoval, Director, Office of Commc'ns Business Opportunities, FCC, Statement Regarding Closing of PCS Entrepreneurs' Block Auction (May 6, 1996), *available at* http://www.fcc.gov/Bureaus/OCBO/ocbospch.wp ("Congress authorized the use of installment payments to allow bidders to pay for their licenses over time, bidding credits and other provisions to lower the capital access barriers which keep many small businesses from competing."); *see also* Noam, *supra* note 133 at 777 n.32 ("[T]he discount in the narrowband spectrum auction to designated entities was up to 40%, plus a preferential payment schedule.").

180. Media Access Project published studies on the Advanced Wireless Services (AWS) auction completed in 2006 alleging that incumbent wireless companies used collusive bidding to exclude new entrants and manipulate the process. *See* Gregory Rose, Tacit Collusion in the AWS-1 Auction: The Signaling Problem (Apr. 20, 2007), http://www.mediaaccess.org/file_download/181 [hereinafter Rose, Tacit Collusion]; Gregory Rose, How Incumbents Blocked New Entrants In The AWS-1 Auction: Lessons for the Future (Apr. 20, 2007), http://www.mediaaccess.org/file_download/180 [hereinafter Rose, How Incumbents Blocked]; *see also* Rose, *supra* note 177 at 4 ("[B]idders have used [non-anonymous] auction rules to engage in behaviors which hamper competition and reduce the efficiency of the resulting allocations, and which threaten the revenue maximization.").

181. *See, e.g.*, Reply Comments of PISC, *supra* note 5, at 13-20 (arguing for caps on

tirely,[182] and combinatorial bidding,[183] all rules that would have limited the ability of Verizon Wireless and AT&T to dominate the auction.

Additionally, both device and applications developers argued that the vertically integrated incumbents had both (1) every reason to discriminate against equipment and applications developers in favor of the incumbents' services and (2) the market power to implement this discrimination.[184] Under the current wireless carriers' oligopolistic dominion, it is nearly impossible to market a wireless phone or mobile device without the permission of the existing carriers, or have a wireless application succeed for use on an existing network without the permission of that carrier.[185] Several prospective entrants argued that the upper band C and D Blocks should be licensed on the condition that the winner's transport services be made available on a wholesale basis.[186]

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the amount of spectrum that could be acquired by incumbents through the auction).

182. *Id.* at 18.

183. Any new entrant seeking to create a new national wireless broadband network from the license of Upper Band Block C would face the substantial risk of buying up eleven of twelve geographic regions, only to be blocked from buying the twelfth by a determined incumbent whose foreclosure value exceeded its market valuation of the remaining regional license. For this reason, a coalition of new entrants of various kinds called the "4G Coalition" (Google, Echostar, DirecTV, Skype, Intel, and Yahoo!) promoted the idea of package or combinatorial bidding. The Coalition argued that package bidding would be simple: a bidder would bid for all regions as a package, and would drop out if unable to obtain one of them. This would avoid the problem of a single incumbent making one market very expensive in order to block the creation of a national network. *See* Comments of the Coalition for 4G in America, *In re* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, at 8-9 (Fed. Commc'ns Comm'n May 23, 2007) (on file with author). Verizon Wireless, for its part, claimed that package bidding would be very complicated, particularly given the limited time before the auction had to be held. *See* Reply Comments of Verizon Wireless, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150, at 3 (Fed. Commc'ns Comm'n June 4, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519516267.

184. *See, e.g.*, *The 700 MHz Auction: Public Safety and Competition: Hearing Before the S. Comm. on Commerce, Science and Transportation*, 110th Cong (2007) (statement of Amol R. Sarva, Wireless Founders Coalition for Innovation), *available at* http://commerce.senate.gov/public/_files/Testimony_AmolSarva_SarvaWrittenStatement0.pdf.

185. See *infra* note 239 for a description of Verizon/AT&T press releases about commitment to openness in the wake of the release of the 700 MHz auction rules. These press releases did not represent a move towards true openness, because these companies continued to reserve a great deal of discretion in permitting devices and applications to use "their" networks.

186. *See, e.g.*, Letter from Richard Whitt, Wash. Telecom and Media Counsel, Google, Inc., to Marlene H. Dortch, Sec'y, Fed. Commc'ns Comm'n, *In re* Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150 (July 9,

In particular, Google played a key role in the 2007 auction-rule brawl by promoting the Internet model of access. Google stated bluntly that it did not want to have to rely on the incumbent carriers' permission in order to reach its customers, and suggested that winning bidders for a portion of the auctioned spectrum should be required to provide four key forms of openness: (1) consumers should be able to download and use any software application;[187] (2) consumers should be able to use any handheld device;[188] (3) resellers and ISPs should be able to acquire services on a wholesale, nondiscriminatory basis;[189] and (4) interconnection of other networks at technically feasible points should be available on a nondiscriminatory basis.[190]

2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519548049; Reply Comments of PISC, *supra* note 5, at 3 ("Significant demand exists for an open network that can provide spectrum wholesale, so that wireless innovators can provide customers with new services that the existing oligopoly refuses to provide.").

187. This condition is often referred to colloquially as "no blocking."

188. This condition is often referred to colloquially as "no locking."

189. Google May 21 Letter, *supra* note 8 (providing further detail by Google). Google also suggested that the winner of a portion of the 700 MHz auctioned spectrum should be required to act as a wholesale provider, running auctions for access to spectrum on an as-needed basis through an online clearinghouse. Devices equipped to act "smart" could be part of such a dynamic, real-time auction for spectrum. Google told the FCC that "[w]hile dynamic auctions can take many forms, the central concept is to utilize intelligent devices to resolve spectrum access contention." *Id.* at 3. "[N]ew, smart technologies can sense the spectrum environment and . . . have the agility to dynamically adapt or adjust their operations. . . . [S]oftware-defined radios can improve utilization, through more efficient access, of the radio spectrum without detriment to existing spectrum users." SPTF-RR, *supra* note 130, at 14. Contention over spectrum would be resolved by the wholesale provider or by the user's device itself using spectrum-sensing techniques, and power transmission limits would be capped by the user's device through adherence to rules imposed by the wholesale provider. Google May 21 Letter, *supra* note 8. The user's device would be tied to a nominal airwaves registration fee that would grant the user the ability to gain unlimited use of available spectrum at specified power levels. This opportunistic use of spectrum, managed by way of the Internet by a central auction clearinghouse, would likely have been a substantial improvement over the current command-and-control spectrum regime. This is similar to the spot auction that Google holds for search terms. Every query using the Google search engine triggers a real-time auction to determine the market price of a particular advertisement linked to a particular search term. Users do not see this auction, but it drives a more efficient and more tightly-focused market for advertising. One law of spectrum use is that "relatively deprived users are virtually forced to innovate spectrum-economizing, spectrum-developing technology." DOUGLAS, *supra* note 34, at 238 n.68 (quoting HARVEY J. LEVIN, THE INVISIBLE RESOURCE 9, 18 (1971)). Google's dynamic auction suggestion certainly fits this category.

190. *See supra* notes 20-21 (explaining forms of openness); Letter of Richard Whitt to Marlene H. Dortch, *supra* note 186 (describing desired openness); Blair Levin et al.,

Google signaled before the auction that it believed that unless the licenses were conditioned on openness, "the existing national wireless carriers [were] likely to prevail in the bidding process,"[191] because the foreclosure value of such a victory to an incumbent would exceed anyone else's market value for the same spectrum. Then, Google threw down the gauntlet, telling the Commission that it was willing to bid $4.6 billion (the likely reserve price) for 700 MHz spectrum that would be licensed in large, regional areas, *if and only if* the Commission agreed to condition the license to be "open" along all four of the key vectors (applications, devices, wholesale access, interconnection).[192]

The Google plan as a whole was aimed at having an enormously disruptive effect on current incumbent wireless Internet access models because it suggested that the Internet model, rather than the cellphone model, should be the construct for Internet access in the future. Public interest

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supra note 101; Kim Hart, *FCC to Rule on Wireless Auction: Lobbying Intense As Google Seeks To Open Market*, WASH. POST, July 30, 2007, at A1 (describing Google requests). Google was also likely interested in bolstering users' upload speeds, because that would increase the amount of content available for Google to search and aggregate. *See also* CFA Comments, *supra* note 4, at 88 ("The so-called 'third-pipe' satellite and 3G mobile wireless products sold by Verizon and AT&T offer upload speeds that are in some cases incapable of originating even low-quality VoIP data. At these levels of upload speed, users have no hope of originating high-quality video.").

191. Posting of Richard Whitt to Google Public Policy Blog, The Promise of Open Platforms in the Upcoming Spectrum Auction, http://googlepublicpolicy.blogspot.com/2007/07/promise-of-open-platforms-in-upcoming.html (July 10, 2007).

192. Letter from Eric Schmidt, Google Inc., to Kevin Martin, Chairman, FCC (July 20, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519559297 ("[S]hould the Commission expressly adopt the four license conditions requested in our July 9th letter—with specific, enforceable, and enduring rules—Google intends to commit a minimum of $4.6 billion to bidding in the upcoming auction."). Why did Google do this? After all, if it won an *unconditioned* license it could have implemented all of these openness rules without the Commission's permission. But asking that openness be mandated served the dual purpose of (1) depressing the amount that the telcos or other players would bid for the spectrum while assuring the Commission that its reserve price would be met, and (2) putting the telcos in the uncomfortable position of having to commit even *more* money in advance of the auction in order to credibly object to Google's suggestion. It was also highly unlikely that the FCC would accede to Google's request for license limitations, so Google had little to lose. On a meta level, Google was interested in shifting the ability to monetize online user activity away from the network operators and to the application layer actors—such as Google itself. From the user's perspective, Google's approach had the potential to unleash great value in the form of unfettered communications. *See* Crawford, *supra* note 110, at 405-406 (arguing that separating transport from content will spur economic growth) .

groups strongly backed the Google approach.[193]

4. Incumbents' Needs

Again, only Verizon Wireless and AT&T had the spectrum holdings necessary to provide nationwide wireless coverage in a cost-effective manner as of late 2007. Their control of existing under-1GHz spectrum, where lower frequencies make possible more resilient communications that rely on far less investment in infrastructure, has granted these two players the benefit of protection from competition, in the form of substantial barriers to entry.[194] For the purposes of this Article, these two players are the almost unbeatable wireless incumbents.[195] They are controlled, in turn, by companies that are almost unbeatable regionally dominant DSL players.[196]

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193. *See* Posting of Kim Maynard to Public Knowledge Policy Blog, Public Interest Groups and High-Tech Companies United Behind Four Principles of Open Access in the Upcoming 700 MHz Auction, http://www.publicknowledge.org/node/1104 (July 18, 2007).

194. *See* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., Dep't. of Justice, *supra* note 22, at 3. Lower-frequency 700 MHz transmissions can travel three to four times the distance and cover ten times the area of, say, 2.5GHz communications (where Sprint has substantial spectrum holdings).

195. Timothy Hay, *Incumbents to Sweep US Spectrum Auction, Analysts Say*, DOW JONES NEWSWIRES, Jan. 18, 2008, *available at* http://www.cellular-news.com/story/28705.php; *see also* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., Dep't. of Justice, *supra* note 22, at 1 (noting that Verizon Wireless and AT&T "have separated themselves from the other purported national carriers," which are "falling further behind the industry giants every month as their plans to introduce cutting-edge services using higher frequency spectrum founder on the crushing economics of nationwide buildout."); Letter from Gerard Waldron, Frontline Wireless LLC, to Marlene H. Dortch, Sec'y, FCC (June 22, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519534453. Verizon ($22.6 billion operating cash flow) and AT&T ($17.8 billion operating cash flow) combined have 64% of the net additions to wireless subscriptions and 120 million subscribers. *Id.* at 3. Even before the auction, AT&T controlled 75 MHz of below-1GHz spectrum and Verizon controlled 60 MHz. *Id.* These holdings dwarfed the 22 MHz that might have been required to be provided on a "wholesale access" basis if the Google proposal for the Upper Band C Block had been adopted by the Commission.

196. These legacy incumbents on the wireline side have, of course, every reason both to resist the entry of new wireless competitors and to keep the cellphone model of Internet access intact. *See* Posting of Harold Feld to Wetmachine, 700 MHz PreGame Show: Reading the Tea Leaves on Verizon and AT&T's Last Moves, http://www.wetmachine.com/item/958 (Dec. 7, 2007). Feld observed:

> Until AT&T absorbed BellSouth (and thus assumed 100% ownership of Cingular) and Verizon assimilated control of its wireless unit, wireless carriers acted primarily as wireless carriers. They had similar inter-

It is fair to say that both the wireless and wireline incumbents share the view that the deregulatory policies put in place by the FCC, and, in particular, the regulator's blessing of the cellphone model for highspeed Internet access, are appropriate. Verizon noted that it is investing billions in highspeed fiber optic connections that can deliver its bundled packages of voice, video, and data, and argued that any form of open access requirements would burden the wireless industry unnecessarily as well as diminish the value of the affected spectrum, to the detriment of the public interest.[197] AT&T argued that the market is fiercely competitive and that it should be allowed to continue to innovate without the limitations of any rules.[198] CTIA, the wireless carriers' trade association, claimed that the wireless industry provides great benefits to the U.S. economy, through investments in the construction and operation of wireless networks, and argued that these investments have only been possible because of the flexibility that wireless licensees have had.[199]

The incumbents tried to persuade the FCC that auction revenues would

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> ests, competed against each other, and generally behaved as a unified class. That has changed in the last year or so. The total integration of AT&T Wireless and Verizon Wireless means that the unified corporate entity is now seeing the wireless aspect as tied to its wireline interests. This impacts behavior. For one thing . . . it means that the telcos will evaluate their actions in this auction on the basis of their overall strategy for wireline and wireless, not merely on the basis of what looks good for their wireless business alone.

Id.

197. Tessler, *supra* note 15 ("Verizon expects to spend nearly $23 billion by decade's end to reach more than 18 million houses with its FiOS fiber-optic network."); Letter from John T. Scott III, Verizon, to Marlene H. Dortch, Sec'y, FCC (July 24, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519560209.

198. Letter from Robert W. Quinn, Jr. to Marlene H. Dortch, *supra* note 2 ("As Chairman Martin has observed—and as many others have echoed—'wireless is the poster child for competition.'"); Letter from Robert W. Quinn, Jr., AT&T, to Marlene H. Dortch, Secretary, FCC (July 2, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519538883 ("AT&T believes that the Commission should continue to allow market forces, and not regulatory fiat, to shape the development of telecommunications services.").

199. Letter from Christopher Guttman-McCabe, CTIA, to Marlene H. Dortch, Sec'y, FCC (June 29, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), available at http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519537846.

be decreased if license conditions were applied.[200] Even though the "open access" rules proposed by Google and others would have applied only to a portion of the spectrum available for auction, and Verizon Wireless and AT&T already had very large spectrum holdings, they fought fiercely against any change to the status quo auction regime in connection with the rules to be applied to the Upper Band C block.[201] The incumbents resisted any change to bidding credit/anonymous bidding/combinatorial bidding rules that had been used in the past.[202] Verizon also resisted the imposition of any geography-based buildout requirements on the winning bidder.[203]

200. *See* Letter from Christopher Guttman-McCabe, CTIA, to Marlene H. Dortch, Sec'y, FCC (Apr. 20, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), available at http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519307855 ("Ultimately, the [proposed license limitations] so devalues the spectrum that it jeopardizes auction proceeds already earmarked for worthy projects including public safety interoperability."); Letter from Robert W. Quinn, Jr. to Marlene H. Dortch, *supra* note 2 ("Google's approach is fatally at odds with the basic purpose of auctioning spectrum. The Commission's charge here is to identify—and to award spectrum to—precisely those companies that Google seeks to exclude from the auction: the companies that value the spectrum most and that will put it to its most efficient use."); Reply Comments of Verizon Wireless, *supra* note 183, at 18 ("Similarly, auction rules that disadvantage incumbent providers to the benefit of potential new entrants are inappropriate and ultimately harmful. . . . Fundamentally, auctioned spectrum should go to the party that values the spectrum most highly and will therefore put that spectrum to its highest and best use.").

201. Letter from Gerard Waldron, Frontline Wireless L.L.C., to Marlene H. Dortch, Sec'y, FCC (June 28, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519537319 ("Verizon and AT&T have an incentive to forestall entry in the 700 MHz band. . . . [T]he incumbent's license valuation is its economic value plus the foreclosure value, which is the loss of incumbent's oligopoly rents were an entrant to win that license.").

202. *See, e.g.*, Letter from U.S. Cellular Corp., to Marlene H. Dortch, Sec'y, FCC (July 10, 2007) (ex parte communication attaching a presentation and regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands) (on file with author) (opposing packaged bidding and anonymous auctions); Reply Comments of Verizon Wireless, *supra* note 183 (same).

203. Reply Comments of Verizon Wireless, *supra* note 183. While the FCC had suggested that winners be obligated to create networks that would serve 75% of the region of the license area within eight years (or forfeit the spectrum), Verizon complained that this obligation to cover sparsely populated areas would place a capital drain on them. Verizon argued instead for population-based buildout requirements, noting that 88% of the population of the U.S. lives in 8% of the country. *Id.* J.H. Snider points out that spectrum lobbyists always promise to quickly build out telecommunications facilities and then do not do so—and the FCC does not effectively enforce these promises. SNIDER, ART OF SPECTRUM LOBBYING, *supra* note 10, at 39; *see also* Fiona Morgan, *What Happens When Telecom Companies Write State Legislation, Check Your Wallet,* INDEP. WKLY., July 14, 2007 (noting that neither AT&T nor Verizon has any immediate plans to roll out fiber

Fundamentally, the incumbents argued that only they could improve the nation's broadband penetration and that any license conditions that diminished their involvement in the auction would inevitably also injure high-speed Internet access nationwide.[204]

Initially, Verizon, AT&T, and the Cellular Telecommunications Industry Association (CTIA), which represents the incumbent wireless players, claimed that *any* form of open access license limitations, including no-locking and no-blocking rules as well as no-retail and wholesale reselling rules, would reduce revenue and endanger public safety.[205] The incumbents argued that to the extent they engaged in locking and blocking practices, such practices were reasonable measures to protect the integrity and efficiency of wireless networks.[206] Just before the 700 MHz auction rules were released by the Commission, both Verizon and AT&T suddenly changed their strong positions and agreed to the idea of limited no-locking and no-blocking provisions.[207] But the Internet model of Internet access,

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services in North Carolina) ("No private company is rushing to provide those sparsely populated communities with any kind of communications service, because the infrastructure is expensive to install. That makes it hard for rural communities to adapt to a post-tobacco, post-textile, post-furniture economy.").

204. Letter from Robert W. Quinn, Jr. to Marlene H. Dortch, *supra* note 2 ("There can be no serious dispute that existing wireless providers, having already invested billions in deploying 3G wireless broadband networks, are best situated to utilize the 700 MHz band to further that deployment.").

205. *See supra* notes 187-188 (defining "no blocking" and "no locking" with reference to Google's July 2007 correspondence with the FCC); *see, e.g.*, Letter from Robert W. Quinn, Jr. to Marlene H. Dortch, *supra* note 2 ("[T]he handset and application certification processes that Google's proposal would foreclose are vitally important to ensuring the efficient utilization and the security of the wireless network."); Comments of CTIA—The Wireless Association, *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150, at 23 (Fed. Commc'ns Comm'n May 23, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519415111 ("[T]he record unmistakably shows that exposing wireless networks to untested mobile handsets and applications would degrade network performance, create harmful interference, prevent carrier compliance with important social policy obligations, and open networks to greater security threats."). Republican legislators agreed. Kim Hart, *FCC Majority Backs Open-Access Plan for Airwaves*, WASH. POST, July 25, 2007, at D2 (noting Republican congressional representatives were unhappy with any possible conditions on license).

206. *E.g.*, Letter from Christopher Guttman-McCabe, CTIA, to Marlene H. Dortch, Sec'y, FCC (June 29, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519537846.

207. *See* Letter from Robert W. Quinn to Marlene H. Dortch, Sec'y, FCC, at 2 (July 20, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762

including wholesale provision of such access, remained off the table.[208] Even though the incumbents could simply have priced wholesale access at a high level, and thus discouraged anyone from using it, avoiding the precedent of such a requirement—and retaining the cellphone model of access—was their central goal.

V. THE COMMISSION RESPONDS

On August 10, 2007, the FCC released its rules for the 700 MHz auction.[209] Somewhat surprisingly, the Commission imposed several conditions that it argued were intended to facilitate the entry of new competition and the emergence of the mythical "third pipe." Yet the deal embodied in the rules, taken as a whole, is strikingly consistent with the vision of the "public interest" that has been adhered to by communications regulators since radio regulation first began. Given the dominance of the existing wireless carriers, their willingness to pay whatever it takes to avoid new entrants and any hint of a "common carriage" model of Internet access, and the inadequacy of the proposed rules to change their current practices, the proposed rules will have the effect of freezing in place the cellphone model for mobile Internet access—even though users and non-communications businesses would likely prefer the Internet model.

A. The 700 MHz Auction Rules

1. C Block Locking and Blocking Rules

For the upper band C Block, the FCC mandated that any winning licensee have in place "no-locking" and "no-blocking" provisions conditioning its use of this spectrum:[210]

& 777-792 MHz Bands, WT Docket No. 06-150) (on file with author); Letter from John T. Scott III, Verizon, to Marlene H. Dortch, Sec'y, FCC (July 24, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519560209.

208. *See* Leslie Cauley, *AT&T Backs Proposed Rules for Spectrum Auctions*, USA TODAY, July 19, 2007, at 3B (noting that Martin had gone out on a limb and forced Verizon and AT&T to support limited "open platform" rules in exchange for avoiding the precedent of a much more restrictive wholesale access requirement).

209. Second Report and Order, *supra* note 1.

210. *Id.* ¶ 202 ("To promote innovation in this spectrum band from the outset, we find it is reasonable to impose certain conditions on the C Block [22 MHz of spectrum licensed on a REAG basis (12 regions)] . . . to provide open platforms for devices and applications."); *see id.* ¶ 205 (rejecting the "argument that mandatory wholesale and other broad regulatory models are necessary at this time to provide incentives for new entry and innovation").

> Licensees offering service on spectrum subject to this section shall not deny, limit, or restrict the ability of their customers to use the devices and applications of their choice on the licensee's C Block network, except:
>
> (1) Insofar as such use would not be compliant with published technical standards reasonably necessary for the management or protection of the licensee's network, or
>
> (2) As required to comply with statute or applicable government regulation.[211]

The no-locking, no-blocking requirements were hedged in by substantial limitations: the winning licensee *would* be able to lock and block devices and applications as long as they could show that their actions were related to "reasonable network management and protection," or "compliance with applicable regulatory requirements."[212] The license winner would not be required to adhere to open-platform requirements on its other spectrum bands, would be allowed to continue to use its own (non-standardized) certification standards and processes to approve uses of devices and applications on their networks, would be allowed to protect the "safety and integrity" of their networks against non-carrier applications and devices, and would be permitted to restrict use of its network to devices "compatible with [the carrier's] network control features."[213] Additionally, carriers would have the ability to deny interconnection to handsets and applications that were unable to provide location information via the carrier's E911 system (a system that is controlled by the carrier itself).[214] In other words, as long as the discrimination could be shown to be connected (however indirectly) to some vision of "network management," it would be permitted.[215] These exceptions arguably provided Verizon, the winner of the C Block auction, with ample slow-roll capability. It will likely be very difficult for non-carrier application providers and device manufacturers to work through the incumbent's certification processes.

2. No Wholesale Access

Importantly, the key condition that would have made it possible for new entrants to provide highspeed Internet access in competition with incumbents was rejected by the Commission. In the view of public interest

211. *Id.* ¶ 230.
212. *Id.* ¶ 222.
213. *Id.* ¶ 223.
214. *See generally* Susan P. Crawford, *The Ambulance, the Squad Car, and the Internet*, 21 BERKELEY TECH. L. J. 873 (2006) (analyzing E911 rulemaking).
215. Second Report and Order, *supra* note 1, ¶ 223.

groups, Google, Frontline, a gaggle of economists, Commrs. Copps and Adelstein, several other countries, and 250,000 Americans, that key condition was mandating wholesale open access.[216] The Commission took the view that the wireless *voice* market was "effectively competitive" and that therefore no government intervention to require resale or wholesale provision was necessary.[217] At the same time, the Commission avoided the question of whether the wireless *highspeed Internet access* market, or the highspeed Internet access market as a whole, was sufficiently competitive.[218]

Chairman Martin made clear that although he would be "troubled" if just one incumbent ended up with a large portion of the radio spectrum made available in this auction, the limited no-locking, no-blocking conditions he had negotiated would go "some way to 'ameliorate' his concerns were one company to acquire a significant portion of [the spectrum]."[219] Thus, even if these extraordinarily limited openness conditions had zero effect on competition for highspeed Internet access or on the facilitation of innovation in devices and applications, and resulted only in the grant of another license to a vertically integrated incumbent, the Chairman would be content.

3. Anonymous Bidding

The Commission decided to use "blind" (anonymous) bidding for the 700 MHz auction.[220] Prior auctions featured open bidding, which allowed

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216. *See supra* Section III.A. In Commissioner Copps's words, "by declining to impose a wholesale requirement on the 22 MHz C-block, the Commission misses an important opportunity to bring a robust and badly-needed third broadband pipe into American homes." Second Report and Order, *supra* note 1 (Copps, Comm'r, concurring in part, dissenting in part). *See also* John Dunbar, *Questions Raised over Broadband Plan*, ASSOCIATED PRESS, July 12, 2007, *available at* WestLaw, 7/12/07 APWIRES 23:35:53 (reporting that although happy with the move to free devices from carrier control, Gene Kimmelman of Consumers Union said the agency was wasting the "best opportunity in modern history to jump-start Internet competition and bring new players to challenge the dominant telephone and cable companies").

217. Second Report and Order, *supra* note 1, at ¶ 200 (citing *In re* Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, 21 F.C.C.R.. 10947 (Sept. 29, 2006)); Eleventh Report, 21 F.C.C.R. 10947, 10950 ¶¶ 2-3 (2006) (Eleventh Annual Commercial Mobile Radio Services (CMRS) Competition Report).

218. Second Report and Order, *supra* note 1, ¶ 201 & n.462 ("[T]he competitive characteristics of the wireless voice market may not be the same as those of the wireless broadband market").

219. *FCC's Martin Says Auction Rules Will Benefit Competition*, CELLULAR-NEWS, July 11, 2007, http://www.cellular-news.com/story/24878.php.

220. Second Report and Order, *supra* note 1, ¶¶ 274-280 ("Based on the current record, we conclude that the public interest will be served if the upcoming auction of 700

bidders to know the names of their competitors and (allegedly) collude to exclude particular third parties by making a competitive package of spectrum licenses expensive.[221] This decision to use blind bidding was a victory for new entrants and public interest groups. The fact that the "foreclosure value" to individual incumbents of the upper band C and D block likely exceeds the market value of these blocks lessens the importance of this decision; the threat that incumbents will make these licenses unrealistically expensive will deter bidding by new entrants.[222] Nonetheless, this "anonymous bidding" step by the Commission was viewed as undermining the incumbents' power to dominate the auction.

4. Package Bidding

In another victory for new entrants, the Commission adopted "package bidding" for the upper band C block:[223]

> With package bidding, a bidder may place an all-or-nothing bid on multiple licenses, and thereby avoid the risk of winning less than all the licenses needed to justify its bid. For example, a bidder whose business plan is premised on realizing economies of scale may need to win a large number of licenses in order to justify the bid that it would make if it could win all of them. The risk of winning less than all the licenses needed to support the amount of the aggregate bid is sometimes known as the "exposure problem."[224]

Package bidding is particularly helpful for a new entrant that is seeking to put together nationwide coverage and does not want to be caught with a set of less-than-nationwide licenses. Absent this rule, a new entrant might be blocked by competitors over a single license that was essential to its business model.

MHz Band licenses for which we establish service rules today is conducted using anonymous bidding procedures . . . .").

221. *See* Rose, Tacit Collusion, *supra* note 180; Rose, How Incumbents Blocked, *supra* note 180; Rose, *supra* note 177, at 3 (noting that, in prior auctions, major incumbents tacitly or explicitly "bid as a coalition against every attempt . . . targeted bidders make to acquire licenses"). The FCC asserted that there were methodological shortcomings in these studies, and that their shortcomings meant that the studies "do not demonstrate that incumbents engaged in retaliatory and blocking bidding behavior." Second Report and Order, *supra* note 1, n.644.

222. *See* Rosston & Skrzypacz, *supra* note 95, at 2.

223. Second Report and Order, *supra* note 1, ¶¶ 287-292.

224. *Id.*

5. Reserve Prices

The Commission's establishment of limited no-locking, no-blocking rules governing the upper band C block was accompanied by a novel escape clause: if the licensed block, as a whole, failed to sell for at least $4.6 billion, it would be reauctioned in smaller chunks to the same bidders without any conditions applied.[225] The FCC, by setting an aggressive "reserve price" for this spectrum block, was trying to comfort both Congress and the incumbents.[226] If limits on the licenses' use had generated lower-than-expected revenues for the Treasury, the limits would have been abandoned.

This move created interesting incentives for the incumbents and for Google. For the incumbents, it would be useful to hold back in the first auction in the expectation that the second time around they would be able to obtain the spectrum without any limitations (or any threat to the cell-phone model of Internet access). Or they could proceed to win the spectrum and work around the limited openness conditions imposed by the Commission. For Google and other new entrants, it would be useful to ensure that the reserve price was met in the first auction so that the limitations would stay in place (and the Internet model of Internet access would be encouraged). Overall, the "reserve price" tactic allowed the Commission to equivocate as to the desirability of any openness limitations at all—in effect putting these modest limitations up for purchase.

6. Public Safety Network

The FCC paired the upper band D block (a single 10 MHz nationwide license) with 10MHz of public safety spectrum located next to the D block. It also conditioned the D block license on an obligation to negotiate

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225. *Id.* ¶ 299. Commissioner Copps disagreed with this "reserve price" approach, saying:

> The procedure in this Order carries chilling risk to the success of the auction. If some of these blocks do not fetch the bid prices stipulated, perhaps because of gaming of the worst sort, they will be re-auctioned with weaker build-out requirements. If the 22 MHz [C] block, where we hope for *Carterfone* open access principles, fails to elicit a $4.6 billion bid, it will be re-auctioned without *Carterfone* open access. In the end, all of this micro-managing virtually hands industry the pen to write the auction rules and to constrict all the opportunities this spectrum held forth. The end result could be: same old, same old. What a pity that would be!

Id. ¶ 298 (statement of Comm'r. Copps).

226. *See* Rosston & Skrzypacz, *supra* note 95, at 4 ("The FCC set very aggressive reserve prices, close to the expected value of the spectrum. Such high reserve prices are unprecedented in FCC auctions . . . .").

with public safety representatives towards the construction, by the D block licensee, of a nationwide public safety network.[227] The idea is that a robust, dedicated public safety network will be built to the specifications of the public safety community. In exchange, the commercial licensee of the D Block will be permitted to use the public safety spectrum (in addition, of course, to the D Block spectrum) when it is not otherwise needed. Absent this private participation, funding for a shared public safety network was unavailable.[228]

Frontline Wireless, a privately held company headed by former FCC Chairman Reed Hundt,[229] had submitted a proposal along the lines eventually adopted by the FCC for the upper band D block.[230] In the event of an emergency, Frontline proposed that public safety would have immediate, preemptive use of the entire network.[231] Frontline won a substantial victory when the FCC decided to allow the D Block licensee to obtain "des-

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227. Second Report and Order, *supra* note 1, ¶¶ 365-66, 383. This is an elaborate plan with many opportunities for tangles along the way:

> The single nationwide 10-megahertz D Block commercial license will be awarded to a winning bidder only after it enters into a Commission-approved Network Sharing Agreement ("NSA") with the Public Safety Broadband Licensee . . . . 'the Commission will oversee the negotiation of the NSA, and will play an active role in the resolution of any disputes among the relevant parties . . . both resulting from the negotiations and once the parties are operating under the terms of the NSA.'

Order, *In re* Waiver of Section 1.2110(b)(3)(iv)(A) of the Commission's Rules for the Upper 700 MHz Band D Block License, FCC 07-197, ¶ 2 (Nov. 15, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-197A1.doc.

228. *See The 700 MHz Auction: Public Safety and Competition Issues: Hearing Before the S. Comm. on Commerce, Science and Transportation*, 110th Cong. (2007) (statement of Wanda McCarley, Ass'n of Public-Safety Commc'ns Officials-Int'l and Nat'l Public Safety Telecomms. Council), *available at* http://www.apcointl.org/news/2007/McCarleyJune14TestimonySenate.pdf, at 4-5. McCarley stated:

> Our support for [ ] a public-private partnership flows from our realization that there is simply no other viable method to pay for a national broadband network that will meet public safety requirements. . . . [M]ost agencies around the country will not have similar funding available to build their own broadband networks, and there is no way to pool funds beyond state or regional systems.

Id.

229. Reed Hundt was the first chairman of the FCC to conduct spectrum auctions. Reed Hundt, Reed Hundt Biography, http://www.reedhundt.com/biography.html (last visited June 11, 2008).

230. Letter from Jonathan D. Blake, Frontline Wireless, to Marlene H. Dortch, Sec'y, FCC (July 3, 2007) (ex parte communication regarding *In re* Serv. Rules for the 698-746, 747-762 & 777-792 MHz Bands, WT Docket No. 06-150) (on file with author).

231. *Id.*

ignated entity" small business bidding credits even if the licensee planned to operate on a wholesale basis.[232] Frontline dropped out before the auction, however, apparently unable to convince investors of the certainty of the enterprise.[233]

The reserve price for the D Block was not met in the 700 MHz auction.[234] If the D Block is eventually auctioned off successfully, this will be a fascinating experiment in public-private partnership. The fact that commercial uses will be secondary to emergency public uses in the combined spectrum will undoubtedly lead to some complex issues. What will the trigger be for public preemption of private uses? Will private users understand this preemption? How will this preemption affect private users' willingness to pay for services provided by this licensee? How will the Commission play the role of champion and protector of public safety, as well as licensor of commercial spectrum? Will Congress establish some sort of congressionally chartered corporate structure to govern this shared public safety network?[235] But these questions are for another article to explore, not this one.

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232. 47 CFR Section 1.2110(b)(3)(iv)(A) (2007) provides that:

> An applicant or licensee that would otherwise be eligible for designated entity benefits under this section . . . shall be ineligible for such benefits if the applicant or licensee has an impermissible material relationship. An applicant or licensee has an impermissible material relationship when it has arrangements with one or more entities for the lease or resale (including under a wholesale agreement) of, on a cumulative basis, more than 50 percent of the spectrum capacity of any one of the applicant's or licensee's licenses.

Frontline took the position that this rule was aimed at preventing sham small businesses that were merely fronts for established incumbents from taking advantage of bidding credits. The Commission eventually agreed, ruling that eligible bidders for Block D that qualify as small businesses under existing rules will be entitled to a bidding credit (a reduction in the amount due on the winning bid) of between 15% and 25%, depending on the bidder's annual revenue, even if the bidder planned to offer services on a wholesale basis. Order, *In re* Waiver of Section 1.2110(b)(3)(iv)(A) of the Commission's Rules for the Upper 700 MHz Band D Block License, FCC 07-197 (Nov. 15, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-197A1.doc.

233. *See* Blair Levin, Rebecca Arbogast & David Kaut, *Frontline Out: Limited Chance of New Entrant Winning in Auction Even Lower,* WASH. TELECOMM., MEDIA & TECH. INSIDER (Stifel, Nicolaus & Company, Balt., Md.), Jan. 8, 2008.

234. Chole Albanesius, *FCC, Congress Spar Over Public Safety Spectrum*, PCMAG.COM, April 15, 2008, http://www.pcmag.com/article2/0,2817,2284009,00.asp.

235. *See* LINDA K. MOORE, CONG. RES. SERV., PUBLIC-PRIVATE PARTNERSHIP FOR A PUBLIC SAFETY NETWORK: GOVERNANCE AND POLICY 17-18 (2007) (suggesting such a structure).

B. The Response

Reaction to the proposed upper band C block rules was swift. Commentators predicted that without the strictures of wholesale access, and with exception-riddled openness requirements, incumbents would avoid any effect on their businesses.[236] Consumer advocates worried that the Commission had done nothing to affect the concentrated market for high-speed Internet access.[237] CTIA, the wireless carriers' trade association, expressed its pleasure at most of the proposed rules, while noting its concern that conditions had been applied to a portion of the auction, saying, "We remain committed to the principle that wireless consumers and American taxpayers are best served when such a valuable commodity is auctioned in a fair and competitive manner with no strings attached . . . ."[238]

But most commentators missed the larger import of the C block rules. Although the Commission had gone far to placate consumer advocates and new entrants (by, for example, adopting anonymous and package bidding), it had not limited the participation of the dominant wireless carriers or the centrality of the cellphone model of Internet access in any substantial way. The Internet model of access, or "common carriage" and unbundling obligations, was off the table. The Commission's weak no-locking, no-blocking rules did not undermine the carriers' existing business practices, and indeed were (facially) swiftly implemented by the incumbents before the auction began. In November 2007, Verizon Wireless issued press releases claiming that it was opening up its wireless network to any device

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236. Testimony of Jason Devitt, Co-Founder and CEO of SkyDeck, FCC Open Meeting, July 31, 2007, *available at* http://www.fcc.gov/realaudio/mt073107.ram; *see also* Posting of Michael Arrington to TechCrunch, FCC Fails to Mark Its Place in History, available at http://www.techcrunch.com/2007/07/31/fcc-fails-to-mark-their-place-in-history (July 31, 2007).

237. *See* Ben Scott, *Who Owns the Airwaves?*, GUARDIAN, Aug. 1, 2007, (Comment Is Free blog), *available at* http://commentisfree.guardian.co.uk/ben_scott/2007/08/public_airwaves_earmarked_for.html. Scott remarked:

> [T]he FCC ignored the broadband problem and gave us unlocked mobile phones to carry between different wireless networks. This decision represents a small step forward for the first issue of consumer choice in mobile phones, but a large step backward for the larger need for genuine broadband competition that could bring the benefits of the Internet to all Americans.

Id.

238. Posting of Peter Suciu to MobileCrunch, CTIA Responds to Latest Rules for 700 MHz Auction, http://mobilecrunch.com/2007/08/01/ctia-responds-to-latest-rules-for-700-mhz-auction (Aug. 1, 2007).

and any application, and AT&T quickly followed suit.[239] These feints towards "openness" were largely meaningless: Verizon Wireless insisted on retaining the ability (1) to privately[240] "certify" applications and devices for use on its network (a process during which a great deal of mischief is possible, as we know from the pre-*Carterfone* days),[241] (2) to sell the heavily subsidized handsets of its partners in its retail stores (which will make it unlikely for competing, full-price handsets to be popular), and (3) to prioritize its proprietary or charged-for content over "ordinary" Internet traffic. The cellphone model of Internet access continued to triumph, with occasional public-relations nods towards the ethos of open Internet access.

C. Comparison to 1920s Spectrum Policy

At the conclusion of the Commission's work, during the summer of 2007, on the 700 MHz auction rules, the FCC emerged from the brawl with a negotiated arrangement that largely served incumbents' interests.

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239. Press Release, Verizon, Verizon Wireless to Introduce "Any Apps, Any Device" Option for Customers in 2008 (Nov. 27, 2007), *available at* http://news.vzw.com/news/2007/11/pr2007-11-27.html; Posting of Om Malik to Gigaom, AT&T, Verizon . . . We are All Open, http://gigaom.com/2007/12/06/att-verizon-t-mobilewe-are-all-open (Dec. 6, 2007); Posting of Ryan Block to Engadget, AT&T Claims Completely Open Network, Too—"The Most Open," Even!, http://www.engadget.com/2007/12/06/atandt-claims-completely-open-network-too-the-most-open-eve (Dec. 6, 2007) (noting that USA Today was taken in by AT&T's announcement).

240. *See* Tim O'Reilly, Op-Ed., *Static on the Dream Phone*, N.Y. Times, Dec. 15, 2007, at 23. AT&T's quick follow-on assertion that it had "flung open its network" was similarly baseless; applications that need to use AT&T's network have to have a "prior business relationship" with AT&T, and GSM phones from other networks have long functioned on the AT&T network. *See* Leslie Cauley, *AT&T Flings Cellphone Network Wide Open*, USA TODAY, Dec. 5, 2007, http://www.usatoday.com/money/industries/telecom/2007-12-05-att-N.htm; Posting of Bryan Gardiner to Wired Blogs, http://blog.wired.com/business/2007/12/how-to-jump-on.html (Dec. 6, 2007, 7:11:39 PM); Posting of Jason Chen to Gizmodo, USA Today Falls for AT&T Openness Spin, http://gizmodo.com/gadgets/cellphones/usa-today-falls-for-att-openness-spin-331028.php (Dec. 6, 2007).

241. *See* Wu, *supra* note 80, at 8 (describing AT&T resistance to "foreign attachments" on the basis that they would threaten the quality of service to be provided over its network). *Carterfone* was the 1968 FCC case that struck down AT&T's private limitations on "foreign attachments" and rejected the argument that "control over all equipment on the network was necessary for the telephone system to function properly." *Id.*; *see also In re* Use of the Carterfone Device in Message Toll Tel. Serv., 13 F.C.C.2d 420 (June 26, 1968). In February 2007, Skype filed a petition with the FCC asking that the *Carterfone* rules be applied to the wireless industry. *See* Skype Commc'ns S.A.R.L. Petition to Confirm a Consumer's Right to Use Internet Communications Software and Attach Devices to Wireless Networks, RM-11391 (Feb. 20, 2007), *available at* http://download.skype.com/share/skype_fcc_200702.pdf. As of the preparation of this Article in January 2008, the FCC had not acted in response to this petition.

The incumbents avoided the disruptive effect of a precedent-setting wholesale requirement that would have mandated that they open their networks to competition and to the Internet model (common carriage, unbundling) of Internet access. Even though some limited "openness" requirements were imposed on block C, these requirements would be avoidable and litigable and were well worth the tradeoff. Because of the foreclosure value of this spectrum to the incumbents, and the almost insurmountable barriers to entry that the incumbents had erected against new competitors, this was an auction in which the incumbents were likely to win all, or virtually all, of the licensed spectrum.[242]

How did this deal compare to 1920s spectrum decisions? The comparison is not simple. During the 1920s, Secretary Hoover (without statutory authority) and the Federal Radio Commission (with statutory authority) assigned and reallocated spectrum on a bold scale, favoring applicants whose "capital investment" and existing spectrum use suggested that they would be successful in using additional spectrum. Hoover, the "political champion of major broadcasters,"[243] as well as the Federal Radio Commission, used their powers to give preference to corporate giants who already held large assignments of spectrum.[244] Hoover and the commercial broadcasters acted together to shape the transmission marketplace by regulatory force. Radio was new, it was being used mostly for entertainment, and other stakeholder interests were not powerful enough to be heard. Even though amateurs and nonprofits had made wide use of radio spectrum before these reallocations, their voices are not part of the historical record of these 1920s decisions. Accordingly, the Federal Radio Commission could act in a "rather high-handed way."[245] In the 1920s, Hoover and the FRC were asserting themselves as the masters of the airwaves, creating a role for federal regulation and thrusting all other interests aside; having the large commercial broadcasters approve of their activities was arguably essential to the very survival of federal communications regulation.

The FCC's institutional position in the spectrum policy world is now arguably different. Rather than asserting itself as the master of a relatively new domain, it now operates within an elaborate ecosystem of existing uses, user preferences, and policy imperatives. It serves several masters,

242. *See supra* Section IV.B.4; *see also* Memorandum from Frontline Wireless, L.L.C. to Antitrust Div., Dep't. of Justice, *supra* note 22, at 3 (noting that barriers to entry include pre-auction below-1GHz spectrum holdings of Verizon Wireless and AT&T, and fixed costs of building out infrastructure to service nationwide network).

243. Hazlett, *supra* note 45, at 152.

244. KRATTENMAKER & POWE, *supra* note 40.

245. *Id.* at 21.

including Congress and public perception of its relevance and authority.

At the same time, the separate communications silos that the FCC has regulated in the past are all converging. Broadcast has been swallowed up by cable, and cable services are indistinguishable in many ways from telephone services. Cable and telephone providers are also selling Internet access. Radio is moving online. Indeed, the Internet could ultimately be the converged form of all of these communications modalities.

The role of the FCC itself is therefore in flux. It is attempting to assert itself as the key rule-maker for converged packet-switched communications, while continuing to please the providers of its traditional regulated services, Congress, and (at least to some limited extent) the public. The FCC's own bureaucratic imperatives mandate that it retain and expand its role in the converged era. At Congress's urging,[246] and under public pressure, the Commission is being forced to recognize the potential and actual economic and social effects of the Internet ethos of openness and flexibility, and is acting differently as a result. It cannot ignore the benefits of open Internet access and the marketplace successes that are dependent on the Internet model of that access. It cannot ignore the effect of Internet communications on its traditional constituents, including broadcasters and telephone companies. The idea that a key block of spectrum would be auctioned off with limited no-locking, no-blocking conditions would have been unthinkable even a year before the 700 MHz auction rules were released, but now is part of the zeitgeist of the converged era.

Yet the 700 MHz auction rules, as a whole, *protected* the wireless incumbents against the inroads of the Internet and the Internet model of access. By rejecting the notion that the market for highspeed Internet access was sufficiently concentrated to require the imposition of a wholesale mandate, the Commission acted to shield incumbents from any real disruption of their business plans. The watered-down, riddled-with-exceptions no-locking/no-blocking rules had scarcely any impact on the incumbents' operations, and indeed were gleefully embraced by these actors for public relations purposes before the auction began. The Commis-

246. For example, a key July 11, 2007 hearing in front of a House subcommittee explored the promise and problems of the wireless industry, and focused media attention on the wireless carriers' success in crippling innovation in devices and applications. Chairman Markey urged the FCC to "foster innovation in the upcoming auction," and Rep. Pickering said that the auction provided an opportunity to create a wholesale marketplace for access. *Wireless Innovation and Consumer Protection and the Internet: Hearing Before the Subcomm. on Telecomm. of the H. Comm. on Energy and Commerce*, 110th Cong. (2007), *available at* http://energycommerce.house.gov/cmte_mtgs/110-ti-hrg.071107.ConsumerProtection.shtml.

sion's actions in this arena are in sharp contrast to policy steps taken in other concentrated communications marketplaces around the world.[247] While providing some concessions to new entrants and online policy voices (anonymous and package bidding, no-locking/no-blocking mandate), the Commission sought to avoid unduly troubling Verizon Wireless and AT&T—even as the global marketplace moved towards open platforms for communications. As an institution, the Commission is still—as it was in the 1920s—fundamentally in the business of remaining popular with large regulated incumbents that already have extensive spectrum holdings.

VI. SPECTRUM AND THE PUBLIC INTEREST

Chairman Martin frequently invoked the importance of the "public interest" in setting the rules for the 700 MHz auction, noting that it was not the same as "what one company advocates."[248] The Commission's *Second Report and Order*, setting forth the 700 MHz rules, mentioned the "public interest" at several key junctures. The Commission maintained that "it *would not* serve the public interest to mandate broader [openness] requirements, such as a wholesale requirement for the unauctioned 700 MHz spectrum,"[249] that providing for a large block (as requested by both the incumbents and Google) "*serves* the public interest,"[250] that "restricting eligibility for licenses [through spectrum caps and the exclusion of incumbents] without adequate justification could *harm* the public interest,"[251] and, finally, that "[t]he use of competitive bidding to assign licenses . . . *serves the public interest* by assigning licenses to the parties *that value the licenses the most.*"[252]

Nothing about the choices made by the Commission in the 700 MHz auction was inevitable, and taken together these choices present a useful case study of telecommunications policy in the 21st century. With the 700 MHz rules, the political economy of spectrum auctions seemed to be functioning well; no one party was either entirely irritated or entirely satisfied.[253] But what *was* the "public interest" in this auction? What question

247. *See supra* Section IV.B.1.

248. John Markoff & Matt Richtel, *F.C.C. Hands Google a Partial Victory*, N.Y. TIMES, Aug. 1, 2007, at C3 (quoting Martin saying that "[t]he Commission needs to decide what is in the public interest, not what one company advocates.") .

249. Second Report and Order, *supra* note 1, ¶ 7 (emphasis added).

250. *Id.* ¶ 80 (emphasis added).

251. *Id.* ¶ 259 (emphasis added).

252. *Id.* (emphasis added).

253. *See* SNIDER, ART OF SPECTRUM LOBBYING, *supra* note 10, at 22 (describing the

was the Commission trying to answer? What should we as a nation do with spectrum policy?

A. The Public Interest in Spectrum Auctions

The hope for spectrum auctions generally had been that they would usher in an entirely new telecommunications sector, unlike the cellular telephone market, in which consumers would have "access to an array of voice, data, and video communications services regardless of where a subscriber may be located."[254] Along these lines, the 700 MHz auction was initially envisioned as the key opportunity to encourage improved Internet access for Americans. The *Second Report and Order* itself stated that "[r]apid deployment and ubiquitous availability of broadband services across the country are among the Commission's most critical policy objectives."[255] This fit with numerous Bush Administration announcements during the period from 2000-2007 in which President Bush and other officials stated that universal highspeed Internet access by 2007 was a key priority.[256] The FCC's stated belief was that "[w]ireless service is becoming an increasingly important platform for broadband access" and the 700 MHz auction would help facilitate the growth of this platform.[257]

In the estimates of some commentators, the auction rules established by the Commission at the beginning of August 2007 did not create the opportunity for competition to the incumbent regional duopoly (DSL and cable) providers of highspeed Internet access.[258] The wireless incumbents, who are themselves controlled by the DSL incumbents, will likely use this 700 MHz spectrum to offer packaged video and audio content to handheld devices that they certify in accordance with the limited no-locking, no-blocking rules established by the Commission. This kind of service will

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"political economy of an FCC license" and pointing out that the "big payoff" for a spectrum lobbyist comes in the license modification phase, after a license has been awarded). We can expect that the incumbents will seek modifications even of the very light *Carterfone* requirements set forth in the 700 MHz *Second Report and Order*.

254. Allard, *supra* note 138, at 17 n.14.

255. Second Report and Order, *supra* note 1, ¶ 196.

256. *See* Mike Allen, *Bush Sets Internet Access Goal*, WASH. POST, Mar. 27, 2004, at A04 (reporting that Bush endorsed the goal of universal broadband access by 2007); *see also* Declan McCullagh, *Bush: Broadband for the People by 2007*, ZDNET, Apr. 26, 2004, http://news.zdnet.com/2100-3513_22-5200196.html.

257. Second Report and Order, *supra* note 1, ¶ 197.

258. *See* Molly Peterson, *FCC Chief May Fall Short of Wireless Market Shakeup*, BLOOMBERG, Aug. 3, 2007, http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a.GC2KLzdRSY ("'The biggest question mark is: will this auction produce any new entrants into either the wireless market or the broadband market?' said [analyst Blair] Levin. . . . 'I don't think it will.'")

not introduce competition into the market for highspeed Internet access or increase the penetration of highspeed Internet access in this country.[259] They were likely to win the auction,[260] and they did indeed win.[261] Verizon Wireless won all the C Block licenses needed for a nationwide footprint, and spent $9.63 billion in total, while AT&T paid $6.64 billion for B Block licenses.[262] Together, AT&T and Verizon accounted for $16.3 billion of the $19.6 billion collected in the auction as a whole.[263]

But even if the wireless incumbents had not won the auction, a national, competitive "third pipe" to the Internet was still an impossible goal given the narrowness of the bandwidth allocated to the upper band C Block, and thus the relatively slow data rates (in comparison to DSL and cable connections) that users could expect from that spectrum.[264] What, then, could the public interest element of this auction have been?

One answer, or set of answers, lies in the statutory language of the Telecommunications Act. Among the objectives of Section 309(j) of the Act are "the development and rapid deployment of new technologies, products, and services for the benefit of the public, including those residing in rural areas" and the "efficient and intensive use of the electromagnetic spectrum."[265] Other public policies arguably include assisting the international competitiveness of the United States and forwarding the role of wireless technology in economic growth.[266] All of these objectives could have been forwarded by imposing a wholesale access mandate for the upper band C Block. Such a mandate could have encouraged competition in open wireless access to the Internet; even if a nationwide "third

259. *See* CFA Comments, *supra* note 4, at 134.

260. *See supra* Section IV.B.4.

261. Marguerite Reardon, *Verizon Wins "Open Access" Licenses in FCC Auction,* CNET NEWS, Mar. 20, 2008, http://news.cnet.com/8301-10784_3-9899829-7.html; Glenn Chapman, *Verizon, AT&T Win FCC Auction, Google Wins Open Spectrum*, AGENCE FRANCE PRESSE, Mar. 20, 2008, *available at* Westlaw, 3/20/08 AGFRP 23:35:00.

262. *See supra* note 24; *see also* Blair Levin, Rebecca Arbogast & David Kaut, *FCC Announces Winning Bidders; Verizon, AT&T Bid 16B for Lion's Share*, WASH. TELECOM, MEDIA & TECH INSIDER (Stifel, Nicolaus & Company, Balt., Md.), March 20, 2008.

263. Levin et al., *supra* note 262.

264. Sprint's recent announcement of a joint venture with Clearwire, funded by Google and others, to use the WiMAX protocol over Sprint and Clearwire's licensed spectrum, may change this landscape—but there are many uncertainties in this arrangement and in the use of the protocol itself. *See, e.g.*, Cecilia Kang and Kim Hart, *Clearwire, Sprint Nextel Set Course for WiMax*, WASH. POST, May 8, 2008, at D01 (May 8, 2008).

265. 47 U.S.C. § 309(j)(3) (2000 & Supp. IV).

266. MOORE, *supra* note 10, at 18.

pipe" was not possible, the forced availability of a platform that was neutral towards devices and applications running on the network would have encouraged competition in those devices and applications. Wholesale, open availability of spectrum in rural areas could have provided a way around the bottleneck of scarce wired highspeed Internet connections, thus making new ways of making a living available to those areas. Experimentation in different forms of nondiscriminatory Internet access would likely have also led to helpful investments in complementary communications equipment. A further step could have been to exclude the wireless under-1GHz incumbents, Verizon Wireless and AT&T, from the auction altogether—or at the least to impose spectrum caps on these actors.[267] The risk that these vertically integrated incumbents will use this spectrum to continue to discriminate against their rivals is very high. These steps would have made possible a proof-of-concept experiment with the Internet access model using this 22-MHz-wide block, and would have provided a needed last-mile assist to rural areas that are inadequately served by DSL and cable providers.[268]

A wireless experiment with the precedent of the Internet access model, which separates transport from content and allows new applications to be introduced without the permission of the transport gatekeeper, would likely be revelatory. We might have found that commodity transport providers can make enough money to survive without charging for use of particular applications and devices under the cellphone model of Internet access. We might have found that spectrum can be used much more efficiently through spot-auctions—auctions for access to spectrum on an as-needed basis through an online clearinghouse.[269] We might have found that devices equipped to act "smart" would have emerged to be connected to this dynamic, real-time auction for spectrum.[270] This opportunistic use of spectrum, managed by way of the Internet by a central auction clearinghouse, would likely have been a substantial improvement over the current command-and-control cellphone model of Internet access.[271] Finally, we might have found that increasing the availability of open wireless Internet access increases Internet access generally, given the competitive pressures created by easily available (even if slow) wireless access.

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267. The FCC has in the past imposed spectrum caps, prohibiting wireless incumbents in the PCS auction from purchasing licenses in areas in which their combined holdings would exceed 45 MHz. Wilkie, *supra* note 21, at 1.

268. *See supra* Section IV.B.3.

269. *See infra* Section VI.B.

270. *Id.*

271. *Id.*

While all of this experimentation might have been deeply destabilizing for the wireless carriers' business plans, encouraging increased access to the Internet should now be a central public policy goal.[272] The link between experimentation and increased access is clear: the results of such experimentation may make it possible for hybrid wireless/fiber systems to be stitched together in imaginative ways that will avoid the current last-mile wireline bottleneck. Even a minor increase in U.S. broadband penetration will have large positive impacts on the U.S. economy.[273] Both mainstream mass media and academic commentators have been persuaded that increased highspeed Internet access is in the public interest.[274] Tom Friedman's "flat world" is upon us, and a key element of American competitiveness will be improved highspeed Internet access.[275] American policy statements often acknowledge this fact, with Rep. Rick Boucher saying that "[e]nsuring that the United States has a robust broadband infrastructure . . . is as important today as building the electrical grid was a century ago."[276]

In sum, there are several potential public interest goals for spectrum auctions in the age of converging Internet communication, including increasing competition, encouraging development of new technologies, encouraging efficient use of the spectrum, and economic growth. Chairman Martin focused on the only one of these that was impossible given the data

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272. I explored these ideas in Crawford, *supra* note 110.

273. *See generally* TURNER, *supra* note 79; *see also* Robert Crandall, William Lehr & Robert Litan, *The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data*, BROOKINGS INSTITUTION ISSUES IN ECON. POL'Y, June 2007, *available at* http://www.brookings.edu/~/media/Files/rc/reports/2007/06labor_crandall/200706litan.pdf (estimating that a one-digit increase in the U.S.'s per capita broadband penetration equates to an additional 300,000 jobs).

274. *See, e.g.*, *Moyers On America: The Net At Risk* (PBS television broadcast Oct. 2006), *transcript available at* http://www.pbs.org/moyers/moyersonamerica/print/netatrisk_transcript_print.html; OECD, *supra* note 15 (U.S. has fallen to 15th place in broadband penetration among the 30 member nations; annual U.S. penetration growth ranked 20th out of 30; semi-annual growth 24th out of 30); TURNER, *supra* note 79 ("Each spot the United States slips [in broadband penetration rankings] represents billions in lost producer and consumer surplus, and potentially millions of real jobs lost to overseas workers.").

275. THOMAS L. FRIEDMAN, THE WORLD IS FLAT: A BRIEF HISTORY OF THE TWENTY-FIRST CENTURY (2005) ("[I]t is our ability to constantly innovate new products, services and companies that has been the source of America's horn of plenty and steadily widening middle class for the last two centuries."); *see generally* REED HUNDT, IN CHINA'S SHADOW: THE CRISIS OF AMERICAN ENTREPRENEURSHIP (2006) (arguing that U.S. needs to reform its legal, technological, and leadership architecture in order to renew American cultural commitment to entrepreneurship).

276. Tessler, *supra* note 15.

rate limitations of the 22 MHz C Block: competition in the form of a "third pipe." The other public interest goals would have been served by different auction rules that treated the C Block as more of an experimental space. Given the predilections and incentives of the current carriers, the only possibility for experiment lay in mandating wholesale open access.

The idea of treating highspeed Internet access as a utility would have been anathema to Herbert Hoover. He was anxious about the terms "public convenience and necessity" being added to the 1927 Act, which had traditionally been used in connection with public utilities.[277] But the reality is that we have a highly concentrated, slow-to-innovate set of Internet access providers serving us, at a time when highspeed access to the Internet is effectively an essential facility. The public interest, as expressed in the Telecommunication Act's instructions to the FCC, arguably dictates that we experiment with wholesale and other mandates that facilitate the Internet model of access.[278]

The next such opportunity is upon us: white spaces. When the DTV transition described in this Article is complete, channels 2 through 51 will remain allocated for television transmission. Few of the nation's television markets actually use 49 channels. Indeed, some use only half that number.[279] The "white spaces" are these unused television channels, which amount to approximately 300 MHz of frequencies. According to Blair Levin, "[e]stimates vary, but most of the population (between 73% and 97%) lives in areas with access to 24 MHz or more of white space. Rural areas in particular, have a great deal of white space as they generally have fewer television broadcasters."[280] Rules for the "white spaces" are now on the Commission's agenda.[281] The fight over who should be allowed to use

277. *See supra* note 48.

278. Another key moment for the public interest will come when the FCC decides to act (or not) in response to the Skype Petition, described *supra* in note 241.

279. *See* Dibya Sarkar, *Vacant Airwaves Spur TV-Tech Turf Battle*, ASSOCIATED PRESS, Apr. 7, 2008, *available at* Westlaw, 4/7/08 APWIRES 19:24:54.

280. Blair Levin, Rebecca Arbogast & David Kaut, *Tech Drive To Use Broadcast White Spaces Hits Bump,* WASH. TELECOM, MEDIA & TECH INSIDER (Stifel, Nicolaus & Company, Balt., Md), Aug. 3, 2007.

281. *Oversight of the Federal Communications Commission: Hearing before the Subcomm. on Telecomm. and the Internet of the H. Comm. on Energy and Commerce*, 110th Cong. (2007) (prepared statement of Robert M McDowell, Comm'r, Fed. Commc'ns Comm'n), *available at* http://energycommerce.house.gov/cmte_mtgs/110-ti-hrg.072407.McDowell-testimony.pdf ("[T]he Chairman intends that the Commission finalize rules [for the white spaces] this fall."); *see also* Public Notice, FCC, Office of Engineering and Technology Announces Projected Schedule for Proceeding on Unlicensed Operation in the TV Broadcast Band (Sept. 11, 2006), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/DA-06-1813A1.pdf (projecting release

the white spaces, and under what conditions, is just beginning.

B. Onward: White Spaces

Rather than being sold at auction to the highest bidder, unlicensed spectrum is usable by anyone with wireless equipment that has been certified by the FCC for unlicensed frequencies.[282] A key advantage of unlicensed spectrum is that experiments in new technology can be carried out without asking the permission of spectrum licensees. To date, we have made very little spectrum available for unlicensed use and experimentation.[283] The FCC has the discretion to decide whether the digital television "white spaces" may be used on an unlicensed basis.[284] Its own Spectrum Policy Task Force recommended in 2002 that such a step be taken.[285] Indeed, in trying to stave off an auction rule in the 700 MHz proceeding that would have dedicated non-built-out spectrum to unlicensed uses, Verizon affirmatively argued that the Commission would be opening up the white spaces on an unlicensed basis—thus making such a rule for the 700 MHz auction unnecessary.[286]

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of Second Report and Order in October 2007). No rules were issued for the white spaces during the fall of 2007.

282. Kenneth Carter, Ahmed Lahjouji & Neal McNeil, *Unlicensed and Unshackled: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues* 4-5 (FCC, OSP Working Paper Series No. 39), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-234741A1.pdf.

283. According to the White Spaces Coalition, comprising Dell, Google, Hewlett-Packard, Intel, Microsoft, and Philips, "of the 'beachfront' spectrum below 2 GHz, only 26 MHz is available for unlicensed broadband use, as opposed to 1,974 MHz for federal or licensed use. Indeed, there is absolutely no unlicensed spectrum available for wireless broadband in the spectrum below 900 MHz . . . ." Reply Comments of Dell, Inc., Google, Inc., Hewlett-Packard Co., Intel Corp., Microsoft Corp., & Philips Elecs. N. Am. Corp., *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, at 30 (Fed. Commc'ns Comm'n Mar. 2, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6518909731.

284. *See supra* text accompanying notes 279-280 (describing the television white spaces); Jon Van, *TV Group Sees Dark Time If White Space Opened Up*, CHICAGO TRIBUNE, Dec. 26, 2007, at C1 ("Called 'white space,' over-the-air channels like 6 and 8 in Chicago are left vacant to prevent signals broadcast on Channels 5, 7, and 9 from interfering with one another."). In most of the country, most of the TV spectrum is not being used. *See supra* note 279.

285. SPTF-RR, *supra* note 130, at 54-63. The Spectrum Policy Task Force recommended continuing to rely primarily on licensed spectrum, but also advocated "co-existence between licensed and unlicensed." William Lehr, Economic Case for Dedicated Unlicensed Spectrum Below 3GHz 14 (May 17, 2004) (unpublished manuscript), *available at* http://itc.mit.edu/itel/docs/2004/wlehr_unlicensed_doc.pdf.

286. Verizon argued in the 700 MHz proceeding that it would not make sense to make a license winner's failure to "build out" its network trigger an FCC order turning

Beginning in 2004, the FCC asked for comments on uses of the white spaces, itself suggesting that broad unlicensed uses of these white spaces would be appropriate.[287] The Commission recognized that the "significant growth of and consumer demand for unlicensed wireless broadband applications" supported opening up the white spaces for broad ranges of unlicensed use.[288] Two years later, the FCC backtracked somewhat from its earlier wholehearted endorsements of unlicensed uses of the white spaces, saying (1) that, at the most, only "fixed" (non-portable) unlicensed uses should be allowed, and, even more disconcertingly, (2) that it is not confident any unlicensed uses are appropriate in the white spaces.[289] The FCC is concerned about the possibility of interference among the transmissions of various users of the white spaces.[290]

The television white spaces are arguably even more important as a

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the purchased spectrum over to unlicensed uses. "As a threshold matter, abundant spectrum already is available for unlicensed services in the 2.4 [Wi-Fi] and 5 GHz bands. Moreover, the Commission likely will make additional spectrum available for unlicensed services as a result of the TV white spaces proceeding." Reply Comments of Verizon Wireless, *supra* note 183, at 16.

287. *See* Unlicensed Operation in the TV Broadcast Bands, 19 F.C.C.R. 10018 (proposed May 25, 2004) ("[W]e propose to allow unlicensed radio transmitters to operate in the broadcast television spectrum at locations where that spectrum is not being used."). This proceeding is still pending.

288. White Spaces NPRM, *supra* note 116, ¶ 7.

289. *See* Unlicensed Operation in the TV Broadcast Bands, 19 F.C.C.R. 10018; First Report and Order and Further Notice of Proposed Rulemaking, ET Docket Nos. 04-186, 02-380, FCC 06-156, Oct. 2006, at ¶ 18 [hereinafter FNPRM] (concluding that portable devices "generally pose a greater risk of harmful interference to authorized operations than fixed devices" and "[w]hile we continue to focus on devices operating on an unlicensed basis, we also ask whether such devices should instead operate on a licensed or hybrid basis"). The National Association of Broadcasters supports this position. *See* Letter from Nat'l Ass'n of Broadcasters to Marlene H. Dortch, Sec'y, FCC (July 26, 2007) (ex parte communication regarding ET Docket No. 04-186) (on file with author); Reply Comments of MSTV & NAB, *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186 (Fed. Commc'ns Comm'n May 15, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519411508 ("[A]t a minimum, the Commission must . . . (3) prohibit all personal/portable devices from operating within the spectrum. Without these protections, television viewers will experience harmful interference which will severely and unacceptably disrupt DTV services.").

290. According to Benkler, "interference is a degradation of the fidelity of reception, caused by transmissions from different sources that are detectable by a receiver, which the receiver cannot sufficiently differentiate to be able to translate into intelligible information." Benkler, *supra* note 50, at 322. Interference is manifested at the receiver and is a contingent property of that receiver; a perfectly "smart" receiver, capable of detecting all possible modulated signals, would never experience interference.

spectrum policy matter than the 700 MHz spectrum, because there is much more bandwidth available: almost 300 MHz of spectrum will be available at the conclusion of the digital television transition.[291] It will be in "swiss cheese" (non-contiguous) form, but there will be a great deal of it.[292] Using white space spectrum as a way to provide "last-mile" connectivity to wired Internet access nodes would be especially valuable in rural areas where those wired nodes are scarce and there is a great deal of vacant TV spectrum.[293]

Unlicensed spectrum is already used to provide highspeed but short-distance wireless access (Wi-Fi) to local area networks, with enormous success.[294] The explosion of Wi-Fi surprised almost everyone. Manufacturers raced to provide certified equipment for hotspots and users quickly became accustomed to finding opportunistic wireless connections in stores and airports. Use of Wi-Fi "created a multi-billion dollar industry at a time when most telecommunications businesses were in a downturn, almost indisputably creating substantially greater value than if the band had been allocated for exclusive use."[295] But the short range of current Wi-Fi, and its limitations to low-power devices, have constrained its use for non-urban settings. Making unlicensed longer-range uses of wireless access widely available would likely lead to a similarly explosive narrative, creating uses where none were possible in the past and creating markets for new devices.

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291. *See* MICHAEL CALABRESE, NEW AM. FOUND. & BEN SCOTT, FREE PRESS, MEASURING THE TV "WHITE SPACE" AVAILABLE FOR UNLICENSED WIRELESS BROADBAND (2006), http://www.newamerica.net/publications/policy/measuring_tv_white_space_available_for_unlicensed_wireless_broadband (mapping available white space in sample TV markets).

292. *Id.* The "swiss cheese," noncontiguous nature of the white spaces also counsels against auctioning off licenses to them; these would be "junky" licenses, but useful unlicensed areas.

293. *See* Jon Van, *TV Group Sees Dark Time If White Space Opened Up*, CHICAGO TRIBUNE, Dec. 26, 2007, at C1. (quoting Brian Peters, Information Technology Industry Council).

294. Werbach, *supra* note 61, at 958-59. The salient difference between unlicensed and licensed spectrum uses is that unlicensed devices are not legally protected from interference and must operate so as not to interfere with licensed uses. Regulation of unlicensed devices therefore is provided in the form of specifications governing equipment design and use.

295. Reply Comments of Dell Inc., Google, Inc., the Hewlett-Packard Co., Microsoft Corp., and Philips Electronics North America Corp., at 23 (Mar. 2, 2007) (citing Kevin Werbach, Former Counsel for New Tech. Policy, FCC, Remarks at the Stanford University Spectrum Policy: Property or Commons Conference (Mar. 1, 2003), *available at* http://werbach.com/docs/spectrum_conf_ comments.html.

If the white spaces were made available on an unlicensed basis for use by opportunistic, "smart," higher-power mobile devices, entrepreneurial engineers will likely think of ways to use this wealth of spectrum to provide longer-range mobile connections to whatever fiber installations are nearest. This would make ubiquitous last-mile highspeed Internet access (particularly in rural areas unreached by the incumbents) possible, and would allow for innovative mobile Internet connections uncontrolled by the incumbents.[296] Free Press takes the position that "[u]sing these white spaces, the wireless broadband industry could deliver Internet access to every American household at high speeds and low prices—for as little as $10 a month . . . ."[297] Cooperative neighborhood mesh networks could use the white spaces to share a single fiber connection to the Internet with hundreds of people.[298]

Interference remains a key issue. The television broadcasters view portable unlicensed uses of the white spaces as threats to their digital television signals.[299] They have launched a large public relations effort aimed at consumers and legislators, arguing that any portable, unlicensed use of the white spaces will create chaos for television programming.[300] Pre-

296. According to Blair Levin, "Some have suggested that the white spaces could even provide the necessary spectrum for a last-hundred-feet solution for delivering broadband." Blair Levin, Rebecca Arbogast & David Kaut, *Tech Drive To Use Broadcast White Spaces Hits Bump,* WASH. TELECOMM., MEDIA & TECH. INSIDER, Aug. 3, 2007.

297. MICHAEL CALABRESE, NEW AM. FOUND. & BEN SCOTT, FREE PRESS, MEASURING THE TV "WHITE SPACE" AVAILABLE FOR UNLICENSED WIRELESS BROADBAND (2005), *available at* http://www.freepress.net/docs/whitespace_analysis.pdf.

298. Comments of Dell, Inc., Google, Inc., The Hewlett-Packard Co., Intel Corp., Microsoft Corp., & Philips Elecs. N. Am. Corp., *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, at 30 (Fed. Commc'ns Comm'n Jan. 31, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6518724310.

299. *Id.* The broadcasters are assisted in this regard by wireless microphone manufacturers who also claim that their services will be interfered with, even though "the vast majority of wireless [microphone] systems are unlicensed and operate illegally." *See* Letter from White Spaces Coalition to Marlene H. Dortch, Sec'y, FCC (July 16, 2007) (ex parte communication regarding *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519557961; *see also* Ex Parte Comments of Shure Inc., *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, at 8 (Fed. Commc'ns Comm'n July 26, 2007), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519560808 ("Shure strongly opposes the view of a few parties that wireless microphone uses are trivial and invalid. Undoubtedly, the millions of Americans who demand high-quality audio in news, entertainment, sports, movies, music, theater, religious, political, educational, corporate, and other contexts would agree.")

300. *See* Van, *supra* note 293 (quoting Dennis Wharton of NAB that "[i]f we [broad-

dictably, the broadcasters also invoke "public safety" as a reason to avoid any possible interference with television transmissions.[301]

The central questions to be addressed by the Commission are: are there portable devices that can operate opportunistically, on an unlicensed basis within the white spaces, without unduly interfering with digital television signals? What is the right measure of "undue" interference in an era in which television's importance is rapidly diminishing?[302] The Commission has not to date made any findings on these key questions and is continuing to test portable devices submitted by Microsoft, Philips, and Google for their sensitivity to incumbent signals.[303] These companies take the view that improved spectrum sensing by smart devices will avoid any interference with digital television transmissions.[304] The broadcasters, portable microphone companies, mega-churches, sports leagues, and (now) cable companies take the view that the *potential* for any interference by portable wireless devices with their transmissions must be avoided at all costs, and that only fixed, licensed wireless uses should be permitted. But because fixed-location devices will be too expensive to be widely used and will therefore never be manufactured in large numbers, Google and others argue that such a limitation will stifle the marketplace.[305] Also, consumers

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casters] are right, implications for devastating TV are very real").

301. Letter from National Association of Broadcasters to Kevin J. Martin, Chairman, FCC (July 27, 2007) (communication regarding *In re* Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6519607853 ("Any significant interference is an unacceptable outcome from a public safety perspective—as the backbone of the public warning it is imperative that Emergency Alert System warnings and live news coverage are ensured robust reception.").

302. As Ellen Goodman has pointed out, these are key inquiries on which spectrum policy will be built. *See* Ellen P. Goodman, *Spectrum Rights in the Telecosm to Come*, 41 SAN DIEGO L. REV. 269, 288 (2004).

303. Press Release, FCC, The Office of Engineering and Technology Announces the Release of Reports of Initial Measurements on TV White Space Devices (July 31, 2007), *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-07-3457A1.pdf.

304. *See* Mark A. Sturza & Farzad Ghazvinian, *Can Cognitive Radio Technology Operating in the TV White Spaces Completely Protect Licensed TV Broadcasting?* 1-2 (New Am. Found. Wireless Future Program, Working Paper No. 16, 2007), *available at* http://www.newamerica.net/files/WorkingPaper16_WhiteSpaceSensing_Sturza.pdf (arguing that spectrum sensing and cognitive radio can protect existing broadcasters from interference).

305. Blair Levin, Rebecca Arbogast & David Kaut, *Tech Drive To Use Broadcast White Spaces Hits Bump,* WASH. TELECOMM., MEDIA & TECH. INSIDER, Aug. 3, 2007. During 2007, Senator Kerry proposed legislation that would require the FCC to allow for portable as well as fixed unlicensed uses of the white spaces. Wireless Innovation Act of 2007, S. 234, 110th Cong. (2007) (requiring the Commission to establish certification

obviously cannot communicate over a *wired* network while driving or riding in a vehicle, which gives mobile devices using wireless connections a key advantage. The fight over the use of personal, portable devices using unlicensed spectrum in the white spaces is just beginning.

The strong public interest in highspeed Internet access and general technological exploration points clearly towards granting permission for portable unlicensed uses of the white spaces. In a sense, we will have two case studies to choose from: the 700 MHz auction rule experience, which is likely to do nothing for increased highspeed Internet access, and the Wi-Fi experience, which has triggered an explosion of innovation in devices and uses of spectrum for Internet access.

The underlying question is one that has been the subject of a great deal of scholarly inquiry over the last ten years, beginning with work by Yochai Benkler: should we always propertize spectrum?[306] The argument in favor of propertizing spectrum is that the existence of interference makes spectrum scarce and therefore makes propertizing it sensible.[307] We assume that, given the possibility of interference, allowing transmitters

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standards for both fixed and portable unlicensed devices in the white spaces). An identical companion bill, Wireless Innovation Act of 2007, H.R. 1597, 110th Cong. (2007), was introduced in the House by Representatives Jay Inslee and Nathan Deal.

306. Benkler, *supra* note 50 (suggesting unlicensed use of spectrum subject to simple "rules of the road," similar to TCP/IP protocol); Benkler, *Some Economics of Wireless Communications*, *supra* note 131; *see also* Noam *supra* note 133, at 768; Comments of David P. Reed, *In re* Spectrum Policy Task Force Report, ET Docket 02-135 (July 10, 2002), *available at* http://fjallfoss.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf &id_document=6513202407. Benkler, in turn, was responding to calls for complete propertization of spectrum through the auction mechanism. *See, e.g.*, Gregory L. Rosston & Jeffrey S. Steinberg, *Using Market-Based Spectrum Policy to Promote the Public Interest*, 50 FED. COMM. L.J. 87 (1997). For a more recent expression of this view, see Thomas W. Hazlett & Matthew L. Spitzer, *Advanced Wireless Technologies and Public Policy*, 59 S. CAL. L. REV. 3 (2006). Ronald Coase made the first argument that spectrum should be treated like any other form of property. Ronald Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1 (1959). Responding to Benkler, Stuart Minor Benjamin has argued that efficiency considerations favor private ownership of spectrum. Stuart Minor Benjamin, *Spectrum Abundance and the Choice Between Private and Public Control*, 78 N.Y.U. L. REV. 2007 (2003). Kevin Werbach has argued in favor of the commons approach but with a focus on wireless equipment usage rights. Werbach, *supra* note 61. The unlicensed position arguably achieved its high-water mark (in terms of FCC policy) in the 2002 Spectrum Policy Task Force report, which suggested that unlicensed use should be treated as an approach whose merits are equal to licensed use. *See* SPTF-RR, *supra* note 130, at 35-37. In the six years since then, the FCC has apparently forgotten its own arguments as to the good reasons to leave some spectrum unlicensed.

307. *See* Arthur S. De Vany et al., *A Property System for Market Allocation of the Electromagnetic Spectrum: A Legal-Economic-Engineering Study*, 21 STAN. L. REV. 1499 (1969).

exclusive property rights against such interference will encourage bargaining among transmitters that will result in having spectrum used for its highest and best purpose.

But if users have portable wireless devices that can sense and avoid legacy signals—and thus avoid interference altogether—the important questions change. Instead of allocating spectrum among a small number of well-funded actors who are willing to pay the most to (presumably) put the economic good of spectrum to its highest and best use, we can focus our attention on defining the "rules of the road" that will best allow users with relatively low-cost, interference-avoiding equipment to cooperate with one another. This user-owned-devices-taking-advantage-of-available-spectrum business model is a challenge to the business models of incumbent spectrum holders—who rely on "owned" spectrum and infrastructure being used for a fee by subscribers.

The upside potential of devices using unlicensed television white spaces spectrum to improve Internet access in this country, particularly in rural areas where the cost of laying fiber is prohibitive, is enormous.[308] We are operating in a context in which scarcity is clearly a regulatory artifact,[309] in which incentives to invent and invest in spectrum-efficient technology would be greater for unlicensed than licensed spectrum, and in which interference is no longer the problem it used to be. At the very least, we should allow experimentation in the manufacture of opportunistic devices that are capable of using white spaces spectrum without causing interference, and this will only happen if some portion of the white spaces is allowed to be used on an unlicensed basis by portable devices. There will still be plenty of licensed spectrum on the books.

VII. CONCLUSION

It is now a wireless world. The radio is becoming the Internet, and the Internet is becoming the radio. Many people see a future characterized by open, opportunistic access, explosive innovation, and a wide choice of devices. The wireless industry in America is, however, controlled by heavy-handed cellular carriers. The history of the development of the 700 MHz

308. As several scholars have pointed out, the case for dedicated unlicensed spectrum includes multiple economic benefits in addition to assistance with Internet access. Availability of unlicensed spectrum will promote innovation in and investment in wireless services (including devices and applications), and encourage the development of new business models for access. *See, e.g.*, Benkler, *Some Economics of Wireless Communications*, *supra* note 131, at 25; Lehr, *supra* note 285.

309. *See* Comments of David Reed, *In re* Spectrum Policy Task Force Report, ET Docket 02-135, at 2-10 (Fed. Commc'ns Comm'n July 15, 2002) (on file with author).

auction rules makes it clear that these cellphone model incumbents would do almost anything to hang onto their market power and avoid the Internet model of online access, including feinting towards "no-locking, no-blocking" rules in order to avoid the greater evil of wholesale mandates. These incumbents were ably assisted by the Commission. Congress had attempted to give substance to the "public interest" standard in its auction-related statutory language, which emphasized new entrants and competition. But in creating the rules for the 700 MHz auction, the Commission (while giving lip service to these statutory exhortations) returned to the early, pre-comparative hearing days of the Federal Radio Commission. It found that deep-pocketed incumbent access to exclusive rights in spectrum should not be limited in any serious way.

Now we are facing another FCC proceeding—the television white spaces—and another chance to get the public interest right. The Commission needs to solve its "public interest" problem. We must recognize that protecting one-way, broadcast television will not assist job growth, economic growth, or any other broadly socially beneficial growth for the United States. Internet access, on the other hand, has enormous potential to facilitate these developments. The FCC needs to recognize that the communications ecosystem of which it is a part is increasingly adopting the Internet ethos of open, no-permission-needed, neutral transport but is being held back by the actions of incumbents wedded to their own business models. The Commission should not be assisting these incumbents.

This is a moment for substantial U.S. telecommunications policy reflection. Both the FCC and Congress need to take steps to liberate swaths of spectrum from licensing and the control of incumbents in order to serve future Internet access needs. Mobile, unlicensed devices that make Internet access available even in remote locations will be crucial. For the 21st century, innovation and creativity are our comparative advantage. If we get this wrong, the consequences will be severe.