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Can You Hear Me Now: Spectrum is Shaping the Telecommunication Industry in an Increasingly Connected America

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I. An Introduction to 4G and Telecommunication in America

The way in which Americans communicate has changed rapidly over the past decade, and the cellular phone has been at the forefront of this revolution, reaching levels of market maturation faster than any mainstream technology since the television.[2] What started as a tool to place calls while on the go has evolved into a device with the processing power of a small computer, where millions of people call, text, tweet, video chat, and stream hours of content every day right from the palm of their hands. While there is no doubt that consumer technology has made incredible strides since the first iPhone ushered in a new product market in 2007 with estimated opening day sales of up to 1 million units, what has changed even more is the invisible infrastructure that allows consumers to be wirelessly connected from even the most remote parts of the country.[3]

Although most Americans are familiar with the country's "Big Four" national cellular providers, (Verizon Wireless, AT&T, Sprint, and T-Mobile), what actually enables these companies to provide wireless internet and cellular service is less well-known. This capability comes from certain bands of the electromagnetic spectrum, which have become an increasingly indispensable commodity for network providers as demand for cellular service surges. Control and licensing of radio spectrum is controlled by the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA).[4] While the NTIA handles the use of spectrum for federal government purposes, the FCC administers

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[2] Michael DeGusta, *Are Smartphones Spreading Faster than any Technology in Human History*, MIT TECHNOLOGY REVIEW, (May 9, 2012), http://www.technologyreview.com/news/427787/are-smart-phones-spreading-faster-than-any-technology-in-human-history.

[3] *Marketing the iPhone: Where would Jesus queue?* ECONOMIST (July 5, 2007), http://www.economist.com/node/9443542.

[4] *Radio Spectrum Allocation,* FEDERAL COMMUNICATIONS COMMISSION, http://www.fcc.gov/encyclopedia/radio-spectrum-allocation (last visited Jan. 3, 2013).

spectrum regulation and licensing for all other uses, including state, local, and commercial functions.[5]

There are two primary methods by which a company may acquire spectrum: They may participate in FCC spectrum auctions (held since 1994 to grant exclusive licenses to qualified companies) or they may purchase attained spectrum from other companies.[6]

The Big Four networks in America already have expansive coast-to-coast networks, a geographical hurdle that most other countries can ignore due to their comparatively small size. So, why is there a mad dash to obtain even more spectrum? For cellular carriers, the concern isn't so much about distance, but about performance and efficiency. Each band of spectrum used by a carrier allows for more bandwidth per user, which affects connection speed and reliability, similar to the way a dual-band wireless router in a home allows for faster and more reliable home internet connections.[7] The first major hint of cellular network performance concerns stemming from smartphones came from AT&T after the launch of the iPhone, when consumers reported slow data rates, dropped calls, and delayed text messages in major metropolitan areas like New York City.[8] The FCC found that the iPhone used 24 times as much data as a traditional cell phone, and AT&T noted that from the time of the release of the first iPhone through 2012, data consumption by consumers increased 20,000%.[9] That growth shows no sign of slowing down,

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[5] *Id.*

[6] *About Auctions: Introduction,* FEDERAL COMMUNICATIONS COMMISSION, http://wireless.fcc.gov/auctions/default.htm?job=about_auctions (last updated Aug. 9, 2006).

[7] Bradley Mitchell, *What is Dual Band Wireless Networking?* ABOUT.COM, http://compnetworking.about.com/od/wireless80211/f/dual-band-wireless.htm (last visited Nov. 3, 2012).

[8] Jenna Wortham, *Customers Angered as iPhones Overload AT&T,* NEW YORK TIMES (Sept. 2 2009), http://www.nytimes.com/2009/09/03/technology/companies/03att.html.

[9] Eric Savitz, *The Future of Wireless: The Case for Spectrum Sharing*, FORBES (Jan. 21, 2013) http://www.forbes.com/sites/ciocentral/2013/01/21/the-future-of-wireless-the-case-for-spectrum-sharing; John Donovan, *Wireless Data Volume on Our Network Continues to Double Annually,* AT&T INNOVATION SPACE, http://www.attinnovationspace.com/innovation/story/a7781181 (last visited Nov. 3, 2012).

and as more Americans acquire even more powerful smartphones and tablets, carriers need to find a way to service hundreds upon thousands of devices while still providing competitive performance and innovation.

Fortunately, explosive advances in technology have not been restricted to devices that use bandwidth. New and more efficient methods of handling cellular networks allow carriers to do more with the spectrum they have. Three organizations playing key roles in the research and standardization of new mobile standards are the 3rd Generation Partnership Project (3GPP), the Global System for Mobile Communication (GSMA), and the International Telecommunication Union (ITU). The ITU is a specialized agency of the United Nations that "allocates global radio spectrum, satellite orbits, and develops technical standards" for a variety of technologies, including cellular networks.[10] 3GPP primarily handles the research and development of new mobile network infrastructure systems while the GSMA works to deploy, standardize and promote the GSM family of wireless infrastructures.[11] The GSM family is made up of a network standard that is utilized by AT&T, T-Mobile, as well as the majority of the European Union and the rest of the world. In 2008, 3GPP finalized the newest infrastructure standard of the GSM Family, called Long-term Evolution (LTE) which would serve as a foundation for a future 4G cellular standard.

The term "4G" has created some confusion for consumers due to the broad definition that has been applied to it. LTE is not, in fact, true 4G, because it does not meet the technical

[10] *Overview*, INTERNATIONAL TELECOMMUNICATION UNION, http://www.itu.int/en/about/Pages/default.aspx (last visited Nov. 1, 2012).

[11] *About 3GPP*, THE 3RD GENERATION PARTNERSHIP PROJECT, http://www.3gpp.org/About-3GPP (last visited April 14, 2014); *GSMA*, CAMBRIDGE WIRELESS, http://www.cambridgewireless.co.uk/directory/orgprofile/default.aspx?objid=35428 (last visited April 14, 2014).

requirements outlined by the International Telecommunication Union (ITU).[12] Nevertheless, the ITU has permitted LTE to be called 4G due to a substantial improvement from previous standards.[13] However, T-Mobile and AT&T both refer to their HSPA+ network as 4G, with AT&T now differentiating between HSPA+ and LTE by referring to the former as 4G and the latter as 4G LTE. This lead to consumer confusion which prompted Congresswoman Anna Eshoo to submit the Next Generation Wireless Disclosure Act which would require cellular advertisers to disclose network speed statistics so consumers could better differentiate among 4G networks.[14]

Consumer confusion aside, the finalization of the LTE standard proved to be a monumental development. Not only did it allow for maximum theoretical download speeds of 300 Mbps and upload speeds of 170 Mbps, which were almost twice and eight times faster than the previous standard, respectively, but it prompted the major non-GSM carriers, such as Verizon and Sprint, to adopt the LTE standard as well.[15] In fact, despite the shift away from the CDMA family of network infrastructures for their next network, Verizon Wireless was the first of the Big Four wireless carriers to begin its LTE rollout which began in December 2010 and has covered 273 million customers in 476 markets as of December 2012.[16] Shortly after, AT&T and

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[12] *ITU World Radiocommunication Seminar Highlights Future Communication Technologies*, INT'L TELECOMMUNICATION UNION (Dec. 6, 2010), http://www.itu.int/net/pressoffice/press_releases/2010/48.aspx.

[13] *Id.*

[14] *Rep. Eshoo Introduces Legislation to Improve Consumer Information on 4G*, PROJECT VOTE SMART, (citing a June 22, 2011 press release from Rep. Anna Eshoo D-Palo Alto, http://eshoo.house.gove/index.php?option=com_content&view=article&id=1009), *available* at http://votesmart.org/public-statement/621323/rep-eshoo-introduces-legislation-to-improve-consumer-information-on-4g#.UwfG4XljZG4.

[15] Wayne Rash, *Verizon Wireless to Launch 4G LTE Service in 30 U.S. Cities*, EWEEK (Sept. 15, 2009), http://www.eweek.com/c/a/Mobile-and-Wireless/Verizon-Wireless-to-Launch-4G-LTE-Service-in-30-US-Cities-417341/.

[16] Press Release, Verizon Wireless, Verizon Reports Strong Revenue And Customer Growth For Verizon Wireless And FiOS Services In 4Q 2012 (Jan. 22, 2013), *(*http://news.verizonwireless.com/news/2013/01/fourth-quarter-2012-earnings.html.)

Sprint also began to deploy their own LTE networks, with T-Mobile being the last of the national carriers to begin its LTE network rollout in 2013.[17]

II. Setting the Groundwork for a 4G America: Auction 73

The catalyst for the foundation of modern-day spectrum circumstances was the FCC's 2008 wireless spectrum auction, called Auction 73.[18] This auction focused on spectrum between the 698 through 806 MHz range, referred to as the 700 MHz band of spectrum.[19] This particular range of spectrum had been used by analog television stations between channels 52 and 69, but it was rendered effectively unutilized when all analog television converted to digital transmission in early 2009.[20] This specific range of spectrum was desirable for large telecommunication providers because it was particularly effective at penetrating walls and travelling long distances without losing quality, which meant that network providers could use fewer towers while maintaining quality connectivity.[21] The FCC divided the 700 MHz band three ways. First, it was split into two halves: 698 MHz – 746 MHz was called the lower band and 746 MHz – 809 MHz was called the upper band.[22] Second, each half was further sub-divided into smaller blocks

[17] Press Release, T-Mobile USA, T-Mobile USA Selects Infrastructure Vendors to Support $4 Billion 4G Network Evolution Plan (May 7, 2012) (http://newsroom.t-mobile.com/phoenix.zhtml?c=251624&p=irol-newsarticle&ID=1805729).

[18] *Auction 73: 700 MHz Band*, FED. COMMUNICATIONS COMMISSION (June 19, 2012), http://wireless.fcc.gov/auctions/default.htm?job=auction_summary&id=73.

[19] Federal Communications Commission, *Auction of 700 MHz Band Licenses Scheduled for January 16, 2008: Comment Sought on Competitive Bidding Procedures for Auction* 73 (Aug. 17, 2007), *available at* http://fjallfoss.fcc.gov/edocs_public/attachmatch/DA-07-3415A1.pdf.

[20] Adam LaMore, *The 700 MHz Band: Recent Developments and Future Plans* (Apr. 21, 2008), http://www.cse.wustl.edu/~jain/cse574-08/ftp/700mhz/index.html.

[21] *Id.*

[22] *Revised 700 MHz Band Plan for Commercial Services*, FEDERAL COMMUNICATIONS COMMISSION (2007), http://wireless.fcc.gov/auctions/data/bandplans/700MHzBandPlan.pdf.

and assigned a letter from A to E.[23] Each block was categorized as a certain kind of market area and subdivided by geographic region or by smaller, more specific regional types, except for Upper Block D, which consisted of a single license that encompassed the entire continental United States.[24] Verizon purchased licenses in Lower Block A and the majority of the licenses for Upper Block C that encompassed the continental United States and Hawaii, while AT&T's purchases consisted primarily of Lower Block B spectrum.[25] This spectrum would be critical to the future development of LTE networks for both carriers.[26]

With the auction complete, the FCC announced it had earned almost $19 million. The only block of spectrum that did not sell was the Upper Block D license, which did not meet its reserve price and only reached one-third of its estimated value during the bidding, despite being a single nationwide license.[27] The failure of this spectrum to sell has been attributed to the fact that potential buyers were not bidding on a completely exclusive license for its usage. While the winner of Upper Block D would get the exclusive commercial license, usage would have to conform to certain regulatory rules, because the spectrum would also be used as a Public Safety Broadband network.[28] While restrictions on spectrum use, such as the openness requirement of Verizon's Upper C Block usually lower the perceived value of the spectrum by potential bidders,

[23] *Id.*

[24] *Id.*

[25] *UHF Spectrum* , SHURE INC. (2009), http://shure.custhelp.com/ci/fattach/get/12094/0/session/L2F2LzEvdGltZS8xMzkyNzc2MDU3L3NpZC9XUmt2a2hObA==/filename/Spectrum+Map+w-Auction+Breakout.pdf.

[26] Kevin Fitchard, *Auction winter lay bare 700 MHz* plans, CONNECTED PLANET, (Apr. 4, 2008, 4:55 PM), http://connectedplanetonline.com/wireless/news/winners-700-mhz-plans-0404.

[27] Carol Pinchefsky, *Ethical Concerns Swirl Around D Block Spectrum Auction*, EWEEK (Mar. 19, 2008), http://www.eweek.com/c/a/Mobile-and-Wireless/Ethical-Concerns-Swirl-Around-D-Block-Spectrum-Auction.

[28] 47 CFR § 27.14 (2012).

the public and private partnership aspect of the Upper Block D spectrum and its inability to sell signaled a dramatic divergence in policy positions by commercial entities and the FCC.[29]

III. And Still There Are Four: Policy Concerns and the Failed Merger of AT&T and T-Mobile

Although Auction 73 produced a substantial number of exclusive licenses for carriers, it quickly became clear that the growing number of smartphone users would require carriers to purchase even more spectrum. One of the harsher critics of the government's spectrum agenda has been AT&T, which claims that exclusive commercial licenses, rather than shared public and private use or even joint private use, is the best way to optimize the use of spectrum.[30] Verizon, while one of the companies with the most substantial gain from Auction 73, also continued to press for spectrum reform as well, claiming that new technologies would be an insufficient answer to its growing bandwidth demands and that more spectrum was the only solution.[31] In the years following Auction 73, both AT&T and Verizon would attempt to obtain more spectrum, albeit with very different results.

When AT&T announced that it had reached a definitive agreement with T-Mobile in March of 2011 for $39 billion, it focused heavily on the public policy benefits that a merger would bring, most likely in an attempt to minimize fears of turning America's nationwide

[29] Sandro Brusco et al, *The 'Google effect' in the FCC's 700 MHz auction*, INFORMATION ECONOMICS AND POLICY (2009), https://faculty.fuqua.duke.edu/~marx/bio/papers/googleeffect.pdf.

[30] Joan Marsh, *The Power of Licensed Spectrum*, AT&T PUBLIC POLICY BLOG (Aug 2, 2012), http://attpublicpolicy.com/government-policy/the-power-of-licensed-spectrum.

[31] In re Applications of Cellco P'ship d/b/a Verizon Wireless & Spectrumco LLC & Cox Tmi, LLC for Consent to Assign Aws-1 Licenses, 29, *available at* http://apps.fcc.gov/ecfs/document/view?id=7021897886

wireless market into a three company race.[32] AT&T noted that the merger was essential if it was going to expand 4G LTE coverage from 80% to 95% of Americans in an effort to help achieve President Obama's call for 98% wireless coverage, and it claimed that the merger would stimulate job growth and lower customer fees despite creating a less competitive market.[33] For AT&T, the Advanced Wireless Services (AWS) spectrum held by T-Mobile would be critical for expanding its LTE footprint in rural areas and improving service in major metropolitan locations.[34] In order to get approval, AT&T and T-Mobile would need both the FCC and the Department of Justice (DOJ) to sign off on the merger.

The first indication of trouble with the merger came on August 11, 2011, when a document with un-redacted confidential information was briefly posted by one of the AT&T attorneys on an FCC website.[35] The document disclosed that AT&T's estimated cost to expand 4G LTE coverage from 80% to 97% would be $3.9 billion if undertaken alone, in dramatic contrast to the $39 billion proposed merger with T-Mobile.[36]

On August 31, 2011, the DOJ filed an antitrust suit to block the merger.[37] In its complaint, the DOJ addressed T-Mobile's unique role as the fourth-largest telecommunication carrier in the country. Using T-Mobile's self-description as a challenger brand using disruptive and highly competitive pricing plans to put pressure on larger rivals and to compensate for

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[32] Daniel P, *AT&T buys T-Mobile for $39 billion, to form America's largest carrier if the deal gets approved*, PHONEARENA (Mar. 20, 2011), http://www.phonearena.com/news/AT-T-buys-T-Mobile-for-39-billion-to-form-Americas-largest-carrier-if-the-deal-gets-approved_id17556.

[33] *Id*.

[34] *Id*.

[35] Karl Bode, *Leaked AT&T Letter Demolishes Case For T-Mobile Merger*, BROADBANDREPORTS (Aug. 12, 2011), http://www.broadbandreports.com/shownews/Leaked-ATT-Letter-Demolishes-Case-For-TMobile-Merger-115652.

[36] Richard L. Rosen, *Notice of Ex Parte Presentation*, 2 (2011) http://www.dslreports.com/r0/download/1678331~018ee90413e657e412818181a5d840ff/DOC.pdf.

[37] Press Release, Department of Justice, Justice Department Files Antitrust Lawsuit to Block AT&T's Acquisition of T-Mobile (Aug. 31, 2011), http://www.justice.gov/opa/pr/2011/August/11-at-1118.html.

weaker national coverage, the DOJ asserted that a "merger would substantially lessen competition in violation of Section 7 of the Clayton Act."[38] The complaint noted that in Cellular Market Areas (CMAs) used by the FCC to license spectrum, AT&T and T-Mobile compete directly in at least 97 of the country's top 100 CMAs as well as other areas that encompass over 50% of the country's population.[39]

While the DOJ did recognize the importance of smaller region-based carriers in a large competitive market, it chose to review the merger from a national perspective, noting that these smaller carriers are often not attractive or available options for consumers due to limited network size and availability.[40] Moreover, it justified using a broad national lens for competitive analysis by citing remarks made by AT&T that the main "forces driving competition among wireless carriers operate at the national level."[41] The DOJ cited concerns about the result of the merger on market concentration, stating that in 96 of the top 100 CMAs, the post-merger Herfindahl–Hirschman Index (HHI) would exceed 2,500 and a national HHI increase of 700 to 3,100, which are both considered to be indicators of high concentration.[42] In addition, more than half of the top 100 CMAs would see AT&T and T-Mobile capture between 40% and 50% of the market share.[43] The DOJ also noted that T-Mobile drove innovation despite its smaller consumer base and profits by being the first network to deploy a nationwide HSPA+ network, sell an Android

[38] USA v. AT&T, Complaint 1:11-cv-01560, pg 3.

[39] *Id.* at 9.

[40] *Id. at 8.*

[41] S*upra* note 38, at 10.

[42] *Id*. at 11-12.

[43] *Id*. at 12.

OS powered handset, provide national Wi-Fi hotspot access, and offer unlimited monthly service plans to consumers.[44]

As the third-largest carrier in the United States, the threat of a merger between T-Mobile and AT&T was also deeply concerning to Sprint. In early September, Sprint and Cellular South filed suit to stop the merger on antitrust grounds.[45] The District Court for the District of Columbia ruled on AT&T's motion to dismiss by addressing a variety of claims brought by the plaintiffs in order to establish antitrust standing on November 2, 2011. To have standing, Sprint and Cellular South had to show a threat of antitrust injury-in-fact, a kind of injury that "antitrust laws were designed to prevent and that flows from that which makes the defendants' acts unlawful."[46] Moreover, plaintiffs had to show that the threatened injury reflected the "anticompetitive effect either of the antitrust violation or of anticompetitive acts made possible by the violation."[47]

While Sprint and Cellular South brought a variety of claims covering topics such as injury to the market of wireless services, spectrum and network development, and network backhaul, the court found that the only claims meeting antitrust standing scrutiny were related to injury to the markets for mobile phones and for regional GSM roaming (of which the former is addressed below).

Sprint argued that the portfolio of smartphones provided by a wireless carrier served as the primary factor in a consumer's selection of a wireless service, which leads carriers to "compete with each other to secure the most desirable devices for their networks, sometimes

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[44] *Id*. at 14.

[45] Cellular South now operates under the name C Spire Wireless and is the 8th largest wireless carrier in the country.

[46] Sprint Nextel Corp. v. AT&T Inc., 821 F.Supp.2d 308, 313 (D.D.C. 2011).

[47] *Id*.

leveraging exclusivity deals with device manufacturers to aid their efforts."[48] Sprint's claim was distinct from the regulatory concerns brought by the DOJ and the FCC. It alleged monopsony concerns as a buyer competing with a merged AT&T/T-Mobile for devices from OEMs, whereas the DOJ and FCC focused more directly on the consumer impact of the merger and its impact on the carriers as sellers.[49] The court applied a rule that when "a defendant, by means of anticompetitive conduct, restricts or forecloses competitor plaintiff's access to necessary input, resulting loss is injury of type that antitrust laws were designed to prevent" and found that the kind of injury alleged by Sprint would qualify as long as it proved to be plausible enough to survive a motion to dismiss.[50]

When addressing whether a plausible injury-in-fact existed, the court stated that when monopsony power is at issue, the controlling factor "is market concentration on the buying side" rather than the selling side.[51] However, since the methods for calculating market concentration are identical to what makes market power in a seller, a larger number of potential buyers is reflective of a smaller control of the market.[52] The court cited two main factors as plausible evidence of monopsony injury from the estimation that a completed merger would give AT&T over 40% of the national market.[53] First, smartphone OEMs are interested in large volume commitments to make up for high research and development costs, and AT&T would have extraordinary capacity to fulfill these needs when competing for new devices with smaller

[48] *Id*. at 320.

[49] A monopsony describes a situation where a single buyer controls a market as the major purchaser of goods and can dictate the purchase terms to its suppliers.

[50] Sprint Nextel, 821 F.Supp.2d at 320.

[51] *Id*. at 324.

[52] *Id*.

[53] *Id*.

providers.[54] Second, the ability of AT&T to obtain exclusivity of top-tier devices has had a historically damaging impact on smaller carriers.[55] Here, as evidence of severe disadvantage, Sprint highlighted AT&T's iPhone exclusivity from 2007 to early 2011 and the eventual addition of the phone on Verizon as it gained a larger proportion of the wireless phone market.[56]

This evidence of AT&T and Verizon using their purchasing power in the past was found by the court as sufficient evidence to substantiate Sprint's claim of injury-in-fact, and Sprint's claim was allowed to go forward.

With a suit from the DOJ and Sprint threatening the chance of a successful merger, AT&T and T-Mobile waited for the FCC to deliver its approval or denial of the merger. However, less than a month after Sprint succeeded in moving forward with its suit, the FCC issued a ruling echoing the concerns of the DOJ that was publically circulated on November 22, 2011.

In its ruling, the FCC reached similar conclusions as the DOJ, taking note of the incredible increase in market concentration in top geographic areas and the negative impact of the merger on innovation and competition.[57] The opinion also addressed the substantial and material questions raised by certain confidential and internal AT&T documents regarding the public interest effect of the merger, the assertion that the merger would create jobs, and that the merger would be essential to AT&T's ability to expand its LTE footprint to a prospective 97% of the country.[58] The FCC also addressed the concern that a merger would eliminate the option of

[54] *Id*. at 324-25.

[55] Sprint Nextel, 821 F.Supp.2d at 325.

[56] *Id*.

[57] In the Matter of Applications of AT&T Inc. & Deutsche Telekom Ag, 26 F.C.C. Red. 16184 (2011).

[58] *Id*. at 16185.

T-Mobile and AT&T consumers to switch between the carriers, something they were prone to do in part because both networks operated on GSM/HSPA networks and used compatible phones.[59]

While the opinion calling for a hearing regarding the merger was not officially issued until November 29, AT&T withdrew its application on November 23 and issued a public statement regarding the withdrawal the next day.[60] The companies permanently ended their merger talks on December 19, citing a full review of their options in light of the opposition from the FCC and the DOJ.[61] As part of the provisions for the failed merger, AT&T agreed to give T-Mobile a total of $3 billion in cash and $1 billion in spectrum.[62] This spectrum transfer was approved by the FCC on April 25, 2012 and included AWS spectrum in 128 CMAs, of which 12 were in the top 20.[63] T-Mobile claimed that this spectrum would be critical to the rollout of its own LTE network in 2013.[64]

IV. Achieving Middle Ground: Verizon, SpectrumCo, and the DOJ Find Compromise through Public Policy

In the aftermath of AT&T's withdrawal of its merger application from the FCC, Verizon took steps to obtain spectrum as well. Rather than focusing on spectrum from a direct wireless competitor, Verizon sought to obtain it from a variety of cable companies operating under a joint

[59] *Id*. at 16212.

[60] Press Release, AT&T, AT&T and Deutsche Telekom Continue to Pursue Sale of DT's U.S. Wireless Assets (Nov. 24, 2011) (http://www.att.com/gen/press-room?pid=22077&cdvn=news&newsarticleid=33396).

[61] Press Release, AT&T, AT&T Ends Bid To Add Network Capacity Through T-Mobile USA Purchase (Dec. 19, 2011) (http://www.att.com/gen/press-room?pid=22146&cdvn=news&newsarticleid=33560).

[62] *Id*.

[63] Press Release, T-Mobile USA, *Transfer of Spectrum from AT&T to T-Mobile Approved by FCC* (Apr. 25, 2012) (http://newsroom.t-mobile.com/articles/FCCApprovesBreakupSpectrumTransfer.

[64] *Id*.

venture called SpectrumCo (consisting of Comcast, Time Warner Cable, and Bright House Communications) as well as Cox Communications for $3.6 billion.[65]

Although the proposal focused on the purchase of unutilized spectrum and did not eliminate any competitors from the market, the agreement raised concerns over a variety of cross-selling agreements between the companies. The deal also included the formation of a joint operating entity (JOE) with all involved parties, and a restriction on Verizon's ability to market and expand its fiber-optic network (FiOS) in places where cable companies would be selling Verizon Wireless service as a part of a "quadruple play" deal consisting of the traditional cable services like TV, landline phone, and internet.[66]

With concerns mounting regarding Verizon's substantial spectrum grab, plans quickly arose to divest certain spectrum to competitors in order to win approval from regulatory bodies. Verizon agreed to sell AWS spectrum to T-Mobile that covered 60 million people in 218 CMAs, including 15 of the top 25.[67] In exchange, Verizon obtained spectrum covering a smaller 22 million consumers, as well as an undisclosed amount of cash.[68] This plan served both companies by creating larger uninterrupted stacks of continuous spectrum for their respective networks.[69]

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[65] Phil Goldstein, *Verizon to buy SpectrumCo's AWS spectrum for $3.6B*, FIERCEWIRELESS (Dec. 2, 2011), http://www.fiercewireless.com/story/verizon-buy-spectrumcos-aws-spectrum-36b/2011-12-02.

[66] Marguerite Reardon, *Verizon's $3.6 billion spectrum deal: Who wins and who loses?* CNET (Dec. 2, 2011), http://news.cnet.com/8301-30686_3-57335808-266/verizons-$3.6-billion-spectrum-deal-who-wins-and-who-loses.

[67] Jessica Dolcourt, *Verizon, T-Mobile swap spectrum for mutual LTE growth*, CNET (June 25, 2012), http://news.cnet.com/8301-1035_3-57459728-94/verizon-t-mobile-swap-spectrum-for-mutual-lte-growth.

[68] *Id*.

[69] *Id.*

Verizon also planned to sell its 700 MHz Block A and B spectrum in order to push the deal through and rationalize its spectrum holdings.[70]

The DOJ eventually approved the deal, but only after adding a variety of pro-competition mandates, such as forbidding Verizon from selling cable services in areas where FiOS is present and removing restrictions on Verizon's ability to sell FiOS, thus keeping it in competition with cable providers.[71] It also held that Verizon would not be allowed to advertise for cable companies within its FiOS footprint, which included pre-existing and legally mandated future build locations.[72] The DOJ did allow for the JOE to survive, but it placed a 2016 termination date on the entity in order to compel the companies to remain mutually competitive. It also restricted the JOE members from entering into any joint venture or partnership without approval by the DOJ, and created non-exclusive licenses to all joint venture technologies at the dissolution of the entity that can be sublicensed to other competitors.[73] Finally, the order required regular reports on the effect of the collaboration on competition.[74]

That same day, the FCC released a statement echoing the sentiment of the DOJ, taking time to characterize Verizon's offering of spectrum to T-Mobile as an "unprecedented" course of action.[75] Less than a week later, the FCC officially approved the transfer as well, but it also

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[70] Press Release, Verizon Wireless, *Verizon Wireless To Conduct Spectrum License Sale* (Apr. 18, 2012) (http://news.verizonwireless.com/news/2012/04/pr2012-04-18f.html).

[71] Press Release, Department of Justice, *Justice Department Requires Changes to Verizon-Cable Company Transactions to Protect Consumers, Allows Procompetitive Spectrum Acquisitions to Go Forward* (Aug. 16, 2012) (http://www.justice.gov/opa/pr/2012/August/12-at-1014.html).

[72] Department of Justice, *supra* note 70.

[73] *Id*.

[74] *Id.*

[75] Press Release, Federal Communications Commission, *Statement Of FCC Chairman Julius Genachowski On Verizon Wireless-Spectrumco And Related Transactions* (Aug. 16, 2012) (http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0816/DOC-315812A1.pdf).

included a variety of stipulations on the transfers. Verizon would be required to offer service to 30% of the customers covered by the new licenses within three years and 70% of customers within seven years.[76] Verizon was also required to continue offering roaming agreements on commercially reasonable terms to commercial mobile data users on any spectrum acquired through the deal for a total of five years. Spectrum would have to be transferred to T-Mobile within forty-five days of receiving the SpectrumCo spectrum, and Verizon would provide reports with "substantial information to the Commission regarding the effect of the agreements on DSL/cable broadband competition."[77]

In comparing the two scenarios, what emerges is a picture of what federal agencies deem the most important public policies. In recent years, Verizon had obtained large amounts of spectrum. However, the DOJ and the FCC were not opposed to allowing Verizon obtain more, in part because it was unused and likely would remain unused by commercial entities, so the buyout would bolster one company without directly damaging or disadvantaging another, as opposed to the AT&T and T-Mobile merger. Moreover, Verizon's offer to sell spectrum to T-Mobile proved a critical move that both agencies applauded. While T-Mobile and Verizon are direct competitors, both networks operate on different systems (GSM/HSPA/LTE and CDMA/LTE, respectively) and engage in different business models, thus limiting the potential competitive harm to Verizon caused by T-Mobile's spectrum acquisition. Finally, the greatest distinguisher, and perhaps the reason that the DOJ and FCC were willing to compromise with Verizon but not with AT&T, was market share. Both agency rulings focused heavily on AT&T's potential gain in the market, the HHI for the industry, and the public policy benefit of a competitively priced

[76] *In re Cellco P'ship*, 27 F.C.C. Red. 10698, 10743 (FCC 2012).

[77] *Id.* at 10743-44.

national carrier. Moreover, with T-Mobile in the final stages of a merger with MetroPCS following the failure of the AT&T deal, the chance to bolster T-Mobile and keep a four-carrier nationwide competitive ecosystem served the public policy position of both the FCC and the DOJ.[78]

V. The Impact of Regional Carriers on National Competition: T-Mobile and MetroPCS Get Approval to Join Forces (and Spectrum)

Just short of a year after the FCC's rejection of the proposed merger with AT&T, T-Mobile announced that it had finalized a merger deal with America's fifth-largest carrier, MetroPCS. Unlike the Big Four, MetroPCS is a regional carrier that focuses service in major metropolitan areas and uses roaming agreements with other carriers to provide service elsewhere. MetroPCS's primary service area is 118 thousand square miles and covers roughly 107 million individuals, whereas T-Mobile's nationwide network is 1.2 million square miles and reaches 283 million people.[79] This merger posed different issues for the FCC and illustrated the requirement for a different analytical approach when contemplating potential mergers between regional and national carriers.

When considering competitive ramifications under the Communications Act, the FCC has to make a determination of the definition of the product market being affected by the merger.[80] The Greenline Institute argued that there was a material difference between

[78] Joseph de Weck, *Deutsche Telekom CEO Says T-Mobile USA Merger Is Option*, BLOOMBERG (May 24, 2012 10:25 AM), http://www.bloomberg.com/news/2012-05-24/deutsche-telekom-says-complete-sale-of-t-mobile-usa-unlikely-1-.html.

[79] In the Matter of Deutsche Telekon AG, FEDERAL COMMUNICATIONS COMMISSION, 3-4 (Mar. 12, 2013), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0312/DA-13-384A1.pdf.

[80] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 10.

"premium" wireless services (such as Verizon Wireless and AT&T) and "value" wireless services (such as T-Mobile and MetroPCS), and that the FCC should distinguish the two markets for the purpose of its competitive analysis because consumers view the two services as different products.[81] However, the FCC found insufficient evidence for such a distinction and used the same product market it had used in recent transactions: "mobile telephony/broadband services."[82]

Moreover, the FCC distinguished its competitive analysis by changing the lens it would use to analyze the merger's impact on competition. While the AT&T/T-Mobile merger was approached from a national perspective, the FCC saw fit to use a local outlook based on the 248 overlapping CMAs of the two carriers.[83] While the FCC justified this local analysis based on the belief that consumers choosing locally marketed services use these services primarily within that region, it did not explicitly make the connection that regional carrier mergers should be approached differently from national ones.[84] Nonetheless, with MetroPCS being the largest regional carrier, a smaller regional carrier facing a similar merger with a national service provider should anticipate a similar analysis.

For its analysis of competitive impact investigation, the FCC identified nineteen CMAs, of which thirteen were Top 100 markets that covered approximately 12% of the population. Of those nineteen markets, only two raised any concern of potential competitive harm.[85] While the post-merger HHI for these two CMAs and for the country as a whole were redacted in the FCC's

[81] Greenlining Inst., Opening Comments Of The Greenlining Institute In The Matter Of Deutsche Telekom AG, 4-5 (2012) *available at* http://apps.fcc.gov/ecfs/document/view?id=7022109936.

[82] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79, at 11.

[83] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79, at 13.

[84] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79, at 12.

[85] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79, at 17.

ruling, the agency found that the number of competitors was reduced from five to four, and that the average amount of spectrum each competitor held in those markets was still greater than what a post-merger T-Mobile company would have.[86] Moreover, the FCC again cited T-Mobile's role as a "maverick" service provider and characterized MetroPCS similarly, stating that their highly competitive pricing structures were critical to their commercial success and that there would be an economic incentive to continue playing this role even after the merger was completed.[87] Also, just as the DOJ chose to omit the impact of regional carriers from its national competitive analysis of the AT&T/T-Mobile merger, the FCC chose to exclude mobile virtual network operators (MVNOs) and resellers from its local competitive analysis. However, the FCC did acknowledge the even cheaper pricing structure often used in comparison to regional carriers like MetroPCS.[88]

When considering the benefits of the merger, the FCC focused more heavily on the benefit it would have on MetroPCS and its customers. At the forefront of the consideration was MetroPCS's limited geographic footprint, which required its engagement in expensive roaming agreements which often limited the services that could be provided to customers outside its primary service area.[89] The FCC reasoned that post-merger MetroPCS customers would benefit from expanded service and features and reduced costs because they would no longer have to finance roaming agreements with other carriers.[90] Moreover, the FCC referenced the fact that its limited amount of spectrum and existence in high-density areas caused MetroPCS problems in

[86] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79, at 18 (finding that in CMAs 12 and 370, that T-Mobile's 90 Mhz of spectrum would still be below the average amount owned by competitors in each market of 101.5 Mhz and 95 Mhz, respectively.)

[87] FEDERAL COMMUNICATIONS COMMISSION, s*upra* note 79, at 19.

[88] A MVNO is a company that offers mobile phone service but does not have any spectrum licenses.

[89] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 22.

[90] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 22.

keeping up with consumer demand for bandwidth, requiring the company to reassign LTE spectrum back to CDMA/EV-DO.[91] Finally, the FCC agreed with the claim that its relatively small market share and less common CDMA network infrastructure limited MetroPCS consumers in the number of handsets that were compatible on the network, and that a post-merger T-Mobile would have more bargaining power when competing with other carriers for new handsets from OEMs.[92]

For T-Mobile, the FCC cited the benefit of merging with a network that already had an LTE footprint, and that MetroPCS's spectrum in major metropolitan areas would be contiguous with T-Mobile's, thereby allowing for better service, efficiency, and coverage.[93] The FCC remarked that one of the deeply rooted preferences of the Communications Act is the acceleration of private sector deployment of advanced services like LTE.[94] While the AT&T/T-Mobile merger promised enhanced rollout of LTE as well, the two mergers were distinguished by the fact that AT&T already had plans for a substantial LTE footprint expansion to compliment what it had already released, whereas T-Mobile had plans of a rollout but had been unable to start its LTE network due to a lack of spectrum. This also helps illustrate the factors weighed by the FCC as it investigates the magnitude of public benefit.

Furthermore, whereas T-Mobile and AT&T would have merged into a single company, T-Mobile and MetroPCS would remain separate brands with their own lines of business, such as retail stores and dealer franchises.[95] While the merger still would mean that T-Mobile and MetroPCS would no longer be competitors, existing and new customers would still have the

[91] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 23.

[92] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 23.

[93] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 25.

[94] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 6-7.

[95] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 30.

option to retain a MetroPCS service plan, and brick and mortar stores would not close due to redundancy brought about by merging the brands.[96] Furthermore, the FCC pointed out that T-Mobile hired more than 3,600 employees since September 2012 and planned to continue hiring throughout 2013, leading to an increase in American jobs, rather than a loss due to the merger.[97]

Ultimately, the FCC agreed that there were strong public interest benefits in allowing a merger to go through. While the agency did cite a select number of markets where competition could be negatively affected, the sliding-scale test employed by the FCC indicated that the nationwide benefits far outweighed the select potentially negative ones. The FCC stated its belief that after the merger, the two companies would be positioned to provide a faster and stronger LTE deployment than either entity could do independently. This harkened back to the AT&T merger, which indicated that AT&T was likely entirely capable of expanding its LTE footprint without purchasing T-Mobile.[98] With a planned LTE rollout for 2013, T-Mobile, while still the fourth-largest national carrier, would now have new resources to make it more competitive than ever.

VI. Making Due Without: Alternatives When Spectrum is Scarce

Naturally, all wireless networks require spectrum in order to provide service, but when certain networks don't have enough spectrum or resources to provide the kind of competitive service or coverage as the biggest carriers, innovation becomes a vital part of drawing in consumers and remaining competitive despite certain disadvantages. Some carriers have begun to tap into the vast public and private Wi-Fi infrastructure to supplement coverage needs,

[96] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 30.

[97] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 30.

[98] FEDERAL COMMUNICATIONS COMMISSION, *supra* note 79 at 27.

allowing for a competitive advantage, low maintenance costs, and inexpensive plans for consumers.

T-Mobile utilizes Wi-Fi in two different ways. First, the company maintains several thousand wireless hotspots in popular businesses such as Barnes and Noble and Starbucks, as well as in airports and hotels.[99] The company also packages VoIP (Voice over Internet Protocol) capabilities into its most popular phones like the Samsung Galaxy S III, allowing consumers to place calls and send text messages over wireless networks even if they do not have a cellular signal. As of early 2012, over 60% of American homes had wireless internet, and with the majority of consumers spending their time at home and work where wireless internet is often available, an average consumer could operate primarily off of wireless internet. This reduces the load on T-Mobile's network, provides supplemental service in areas where coverage is weak or not available, and costs very little to maintain.[100]

This seems like a natural and relatively inexpensive method to improve service quality without a major infrastructure investment, yet T-Mobile is the only Big Four carrier to preinstall the capability on its phones, despite the general consensus that more spectrum is needed to provide the coverage and quality that consumers demand.[101] For larger networks with more robust coverage, not actively promoting VoIP allows carriers to more effectively profit from contracts with expensive minute plans. Nielsen has found that consumers use fewer and fewer

[99] Mobile Internet Hotspots & Smartphone Wifi Internet Access, T-MOBILE, http://www.tmobile.com/shop/addons/Services/information.aspx?PAsset=InternetEmail&tp=Svc_Tab_HotSpot&tsp=Svc_Sub_LaptopHotspot&osid=4745E503-3612-4E0F-9044-DE881A7F91CC (last visited Feb. 5, 2013).

[100] *Wi-Fi Calling*, T-MOBILE, http://t-mobile-coverage.t-mobile.com/4g-wireless-broadband-service (last visited Feb 3, 2013).

[101] Third party VoIP applications that support calling over WiFi or through mobile data are readily available on the Google Play store and Apple App Store and can be installed on most phones regardless of carrier, make, or model. However, most require a Google Voice account or other VoIP service account.

minutes every month, with the average male consumer using as few as 605 minutes a month in 2011.[102] However, individual plans often gouge the price of minutes and force individuals to buy more than is needed, or force a consumer to sacrifice other features such as mobile data.[103]

Another unique innovation in telecommunication comes from Republic Wireless, a wholly owned subsidiary of Bandwidth.com.[104] The network leased network access from Sprint and purchases wholesale minutes from Sprint while charging its own subscribers a low monthly fee with no limits on voice, text, or data usage.[105] What makes this network unique is that Wi-Fi serves as the primary source of connectivity. Each phone is equipped with an application that searches for Wi-Fi that allows all voice and messaging to be routed through it.[106] Only when Wi-Fi is not available does it rely on Sprint's network, thus limiting extra network strain. While the technology is still somewhat limited by slower cellular speeds, a lack of compatible handsets, and a reliance on Sprint for cellular network access, Republic Wireless's endeavor to provide an affordable yet fully featured smartphone experience without owning its own spectrum sets the framework for a new class of telecommunication providers. Moreover, it allows Sprint to more effectively monetize its network by selling access to low-usage consumers who rely primarily on Wi-Fi, thus not creating substantial additional demand on its network.

As network load increases, VoIP calling may become a more mainstream solution for carriers looking to find ways to lessen the burden on network strain rather than buying more spectrum. As the FCC and other regulatory bodies continue to hit back against the exchanging

[102] The Mobile Media Report: State of the Media: Q3 2011, 24-25 (2012) NIELSEN, 24-25 (2012) *available at* http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2011-Reports/state-of-mobile-Q3-2011.pdf (last visited Feb. 3, 2013).

[103] Verizon Wireless offers a minimum of 700 minutes plans for basic phones but requires that customer pay per text and per MB of mobile data. Smartphone plans come with unlimited voice minutes as the only option.

[104] *What is Republic Wireless?* REPUBLIC WIRELESS, http://republicwireless.com/about (last visited Feb. 3, 2013).

[105] *Republic Wireless Plans*, REPUBLIC WIRELESS, https://republicwireless.com/plans (last visited May 16. 2013).

[106] *Our Story*, REPUBLIC WIRELESS, http://republicwireless.com/how-republic-works (last visited Feb. 3, 2013).

of spectrum between various companies, the option to utilize Wi-Fi for more than just basic internet access may prove to win the cost/benefit analysis for carriers concerned with losing large amounts of money and time on failed business deals. With a rapidly growing Wi-Fi infrastructure available with limited regulatory red tape, hybrid networks like the one supplied by Republic Wireless may become a carrier standard in the future. In the meantime, carriers will continue to push customers onto Wi-Fi however best they can, including utilizing persistent Wi-Fi reminders on devices connected to a mobile network.[107]

The solutions to solving network strain aren't just of the technological variety. When faced with high demand for data from an increasingly growing consumer base, major networks are betting that consumers will either be willing to pay higher monthly fees for larger data allotments or stop using as much data as they would normally use. Verizon accomplished this by ending unlimited data plans for new customers in mid-2011 and forcing them onto multi-tiered monthly data plans instead.[108] This created an immediate impact on consumers, who could once use unlimited data for $30 a month, but were now forced to choose between a plan starting as low as 2GB for $30 a month, or something as high as 10GB for $80 a month.[109] While preexisting Verizon customers could continue to remain on their unlimited plans, Verizon would often attempt to coax new and old customers alike onto tiered plans by promoting special offers where customers could receive double the data for the same price as the normal tiered plans.[110]

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[107] Kellen Barranger, *Yo Verizon, What's With This Ongoing Wi-Fi Toggle Notification on the Galaxy S3 and Incredible 4G?* DROID-LIFE, (Jul. 7, 2012), http://www.droid-life.com/2012/07/06/yo-verizon-whats-with-this-ongoing-wi-fi-toggle-notification.

[108] Nathan Eddy, *Verizon Ends Unlimited Data Plans, Introduces Tiered Pricing*, eWEEK, (Jul. 6, 2011), http://www.eweek.com/c/a/Midmarket/Verizon-Ends-Unlimited-Data-Plans-Introduces-Tiered-Pricing-691001.

[109] *Id*.

[110] Roger Cheng, *Verizon's double data promotion to reappear Friday*, CNET, (Feb. 6, 2012), http://news.cnet.com/8301-1035_3-57372261-94/verizons-double-data-promotion-to-reappear-Friday.

If not incentivized by a special bargain on data, Verizon and AT&T both chose to throttle the connection speeds of their largest data consumers.[111]

Finally, Verizon introduced a "Share Everything Plan", which allowed customers to buy into a single pool of data for multiple devices, in the same way that family plans allow customers to share monthly minute and text allotments.[112] While this billing structure proves efficient for customers who utilize a large number of calling minutes and texts and who use relatively small amounts of data, the pricing for more traditional minimal talk, high text, and large data consumption users skyrocketed, with the cost of 1 GB of data starting at $50 a month to share.[113] This plan also substantially increased the monthly access fee for devices from $10 a month per device to as much as $40 per device, serving as a deterrent from adding more devices that can consume data.[114] However, unlike with the introduction to tiered data plans, customers already on unlimited plans would be forced off of them if they chose to utilize a carrier subsidy on a new phone at the end of a two-year contract.[115] In the end, it leads to higher fees, deters the use of data, and restricts the adoption of the technology from lower-income Americans.[116]

With AT&T following a similar path as Verizon with pooled data plans, smaller networks like Sprint and T-Mobile are using this shift in data plan paradigms to entice customers with

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[111] Press Release, AT&T, *An Update for Our Smartphone Customers With Unlimited Data Plans* (July 29, 2011) (http://www.att.com/gen/pressroom?pid=20535&cdvn=news&newsarticleid=32318); Kellen Barranger, *More Verizon Policy Changes, Reducing Data Speeds for "Extraordinary" Customers*, DROID-LIFE, (Feb. 3, 2011), http://www.droid-life.com/2011/02/03/more-verizon-policy-changes-reducing-data-speeds-for-extraordinary-customers.

[112] Press Release, Verizon Wireless, *Verizon Wireless Unveils New Share Everything Plans For Basic Phones, Smartphones, Tablets And More* (June 12, 2012) (http://news.verizonwireless.com/news/2012/06/pr2012-06-11e.html).

[113] *Id.*

[114] *Id.*

[115] Press Release, Verizon Wireless, Updated Statement on Data Plans (May 17, 2012) (http://news.verizonwireless.com/news/2012/05/data-pricing.html).

[116] *See Mobile Trends in Low Income Communities*, WillowTree Apps, (Nov. 12, 2012) http://www.willowtreeapps.com/wp-content/uploads/2012/10/mobile_lowincome_v2.pdf.

unlimited data and less expensive contract or pre-paid monthly billing options, some even offering hundreds of dollars in credit to make a transition.[117] As smartphones become more readily available and more affordable, carriers like T-Mobile are seeking to adopt subsidy-free payment plans, which allow customers to pay full price for a new device or bring an unlocked device from another compatible network in exchange for lower monthly rates that can ultimately lead to long-term savings.[118] Ultimately, it will most likely be a balanced combination of bandwidth-saving benefits and financial incentives to customers that will allow major carriers to remain competitive and profitable while still providing consumers with the service they expect.

VII. Spectrum Futures: Is Devaluation Imminent?

While America's wireless carriers continue to seek new ways to obtain needed spectrum in the race for 4G dominance, plans are already taking shape for what lies beyond LTE in the form of Voice over LTE (VoLTE) and LTE-Advanced. VoLTE allows voice calls and messages to be delivered over LTE, instead of falling back to a legacy network.[119] Over time, this would allow carriers to slowly stop supporting legacy networks and devices, consolidate spectrum, and repurpose it for current-generation infrastructures. In May 2014, AT&T announced that it would

[117] Press Release, AT&T, AT&T Gives Customers More Choice with New Shared Wireless Data Plans (July 18, 2012) (http://www.att.com/gen/press-room?pid=23084&cdvn=news&newsarticleid=34855); Chris Burns, *AT&T Shared Data Skewered by T-Mobile Claims*, SLASHGEAR (Jul. 18, 2012), www.slashgear.com/att-shared-data-skewered-by-t-mobile-claims-18239224; Press Release, Sprint, Sprint Challenges Competitors' Shared Data Plans With New Advertising Campaign "Say No To Sharing" and "Say Yes To Sprint" (Aug. 31, 2012) (http://newsroom.sprint.com/article_display.cfm?article_id=2378).

[118] Sinead Carew, *T-Mobile USA to Soon Sell iPhones, Cut Subsidies: CEO*, REUTERS (Jan. 9, 2013, 12:41 AM), http://www.reuters.com/article/2013/01/09/us-ces-tmobileusa-idUSBRE90806420130109; Thomas Gryta, *Could Verizon, AT&T Follow T-Mobile in Ending Subsidies*, WALL STREET JOURNAL (Jan. 7, 2013, 8:08 PM), http://blogs.wsj.com/digits/2013/01/07/could-verizon-att-follow-t-mobile-in-ending-subsidies.

[119] *GSMA VoLTE initiative*, GLOBAL SYSTEM FOR MOBILE COMMUNICATION, http://www.gsma.com/technicalprojects/volte (last visited Nov. 18, 2012).

be the first nationwide carrier to begin its public launch of VoLTE.[120] Prior to AT&T's announcement, MetroPCS had been the first and largest regional service provider in the country to offer VoLTE services.[121]

Perhaps even more substantial than VoLTE is LTE-Advanced, the next generation of wireless infrastructure. LTE-Advanced meets the ITU standard for 4G, unlike current LTE networks, and adds increased bandwidth, higher efficiency, and faster data transfer rates.[122] Moreover, LTE-Advanced is backwards compatible with current LTE network towers, and will utilize the spectrum already being used by LTE networks, allowing for a completely new network without the need to purchase new spectrum.[123]

With almost every carrier currently maintaining simultaneous networks, this would begin to limit the need to obtain more spectrum to build a new network, potentially driving down the price of spectrum, and limiting the policy restrictions that regulatory agencies might place on its use. Verizon Wireless has already announced a soft shutdown date of 2021 for its legacy networks.[124] However, with just over 23% of its customers on a LTE enabled device, 58%

[120] Press Release, AT&T, AT&T Introduces High-Definition Voice in Initial Markets (May 15,2014) (http://about.att.com/story/att_introduces_high_definition_voice_in_initial_markets.html.)

[121] Press Release, MetroPCS, MetroPCS Launches World's First Commercially Available Voice Over LTE Service and VoLTE-Capable 4G LTE Smartphone (Aug. 7, 2012) (http://www.metropcs.com/assets/presscenter/assets/pdf/MetroPCS%20VoLTE%20Handset%20-%20FINAL.pdf.)

[122] *What's new in LTE-Advanced*, 4 (2011), AGILENT TECHNOLOGIES, http://cp.literature.agilent.com/litweb/pdf/5990-6706EN.pdf (last updated Oct. 14, 2010).

[123] Chintan Patel, *Emerging Aspects of LTE-Advanced towards IMT-Advanced Recognition*, http://www.chintan-patel.com/articles/long-term-evolution-lte/emerging-aspects-of-lte-advanced-towards-imt-advanced-recognition (last visited Feb. 3, 2013).

[124] Mike Dano, *Verizon Wireless to sunset 2G and 3G CDMA networks by 2021*, FIERCEWIRELESS, (Oct. 10, 2012), http://www.fiercewireless.com/story/verizon-wireless-sunset-2g-and-3g-cdma-networks-2021/2012-10-10.

customers using a smartphone, and most customers on a 2-year contract cycle, Verizon may be able to shutter the network sooner than predicted by incentivizing customers to upgrade.[125]

Will spectrum lose its allure or value overnight? No, but as the modern telecom industry reaches the end of its growing pains, companies and engineers alike will continue to seek more efficient ways to maximize the spectrum they already have. Therefore, this period of time is critical as it will set the competitive landscape for the next generation of cellular technology. As technology allows service providers to make do with what they have, administrative agencies like the FCC may no longer dramatically and directly shape the competitive landscape, nor, in the process, advocate for consumer federal interests. Nevertheless, as cellular technology continues to advance and as consumer adoption grows, it appears that spectrum will continue to be at the forefront of the fight for commercial supremacy.

[125] Aaron Souppouris, *Verizon posts $4.23 billion Q4 loss despite record subscriber growth and smartphone penetration*, THE VERGE, (Jan. 22, 2013), http://www.theverge.com/2013/1/22/3902712/verizon-q4-2012-earnings-iphone-sales.