

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
A National Broadband Plan for Our Future)	GN Docket No. 09-51
)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act)	GN Docket No. 09-47
)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act)	GN Docket No. 09-137

**COMMENTS—NBP PUBLIC NOTICE #26
T-MOBILE USA, INC.**

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T-Mobile USA, Inc. (“T-Mobile”) hereby submits its responses to the questions raised by the Federal Communications Commission (“FCC” or “Commission”) in its Public Notice seeking comment on the potential repurposing, for wireless broadband services, of spectrum currently licensed to broadcast television stations.^{1/} T-Mobile is the fourth largest wireless carrier in the United States and serves approximately 33 million customers; it has been an active participant in the FCC’s proceeding designed to formulate a national broadband plan.^{2/}

^{1/} *Data Sought on Uses of Spectrum*, NBP Public Notice #26, DA 09-2518 (rel. Dec. 2, 2009) (“Public Notice”).

^{2/} *See, e.g.*, Comments of T-Mobile USA, Inc., GN Docket No. 09-51 (filed June 8, 2009) (“T-Mobile National Broadband Plan Initial Comments”); Comments – NBP Public Notice #6 of T-Mobile USA, Inc., GN Docket Nos. 09-47, 09-51, & 09-137 (filed Oct. 23, 2009) (“T-Mobile NBP Public Notice #6 Comments”); Reply Comments – NBP Public Notice #6 of T-Mobile USA, Inc., GN Docket Nos. 09-47, 09-51, & 09-137 (filed Nov. 13, 2009) (“T-Mobile NBP Public Notice #6 Reply Comments”);

INTRODUCTION AND SUMMARY

As T-Mobile has explained in this and other proceedings, demand for mobile wireless broadband services is exploding and will quickly outpace the nation's available supply of spectrum. Chairman Genachowski has similarly warned that this country is facing a "looming spectrum crisis."^{3/} Wireless broadband providers require access to spectrum with good propagation and other characteristics favorable to those services in order to meet consumer expectations. Failure to dedicate more spectrum to broadband services in the very near future will set back wireless growth and innovation, putting the U.S. at an economic and competitive disadvantage.

As part of its efforts to ensure sufficient spectrum for wireless broadband services, the Commission should reclaim and repurpose a portion of the broadcast spectrum. Reallocation of broadcast spectrum to wireless broadband could create new jobs and lead to new investments in network infrastructure. These new jobs and investments, in turn, will foster competition and innovation in the wireless and broadband sectors.

The allocation of the advanced television spectrum to broadcasters in the mid-1990s was implemented without a clear sense of the future of either wireless or video services. In the succeeding 15 years, consumers have increasingly chosen to obtain their video programming from multichannel video programming distributors and, more recently, on the Internet – rather than directly from over-the-air broadcast transmissions. At the same time, the use of spectrum to deliver broadband services, dimly if at all perceived then, has become a top priority of the

Comments – NBP Public Notice #11 of T-Mobile USA, Inc., GN Docket Nos. 09-47, 09-51, & 09-137, WC Docket No. 05-25 (filed Nov. 4, 2009) ("T-Mobile NBP Public Notice #11 Comments").

^{3/} See Hon. Julius Genachowski, Chairman, FCC, "America's Mobile Broadband Future," prepared remarks, International CTIA Wireless I.T. & Entertainment, San Diego, CA, at 4 (Oct. 7, 2009).

Commission and this Administration. In view of these developments, the decision to permit each broadcaster to hold 6 MHz of spectrum must be revisited.

While broadcasters play a vital role in providing television services to a segment of the public, that segment is shrinking and broadcasters do not require the entire amount of spectrum they are allocated to meet projected needs. The technical characteristics of the spectrum currently allocated for broadcasting makes it ideal for the provision of wireless broadband service. Notwithstanding the challenges associated with reallocating this spectrum, T-Mobile respectfully urges the Commission to begin steps now to determine how at least some of the spectrum may be reallocated in a way that will make it useful for wireless broadband services.

I. THE EXPLODING DEMAND FOR WIRELESS BROADBAND SERVICES HAS PRODUCED THE “LOOMING SPECTRUM CRISIS”

The Commission asks what it should consider when “examining and comparing the benefits of spectrum used for over-the-air television broadcasting and those of spectrum used for wireless broadband services.”^{4/} The most fundamental issue the Commission should consider is the demand for the types of services provided by television broadcasting and those supported by wireless services. T-Mobile has repeatedly emphasized the increasingly urgent need for more spectrum dedicated to mobile broadband due to the American public’s increasing use of and demand for bandwidth-intensive services and applications.^{5/}

^{4/} Public Notice at 1 (Question A.1).

^{5/} See, e.g., T-Mobile National Broadband Plan Initial Comments at 5 (reporting that the number of 4G service subscriptions worldwide is estimated to reach 126 million by year-end 2014); T-Mobile NBP Public Notice #6 Comments at 5-13 (urging the Commission to assist mobile providers in addressing increasing consumer needs for bandwidth); T-Mobile NBP Public Notice #6 Reply Comments at 3-4 (supporting CTIA’s proposal for the Commission to allocate an additional 800 MHz of spectrum for mobile broadband use); T-Mobile NBP Public Notice #11 Comments at 4 (noting Cisco’s prediction that mobile data traffic at the global level will increase 66 times between 2008 and 2013); Workshop Response of T-Mobile USA, Inc., GN Docket No. 09-51, at 4 (filed Sept. 15, 2009) (reiterating that new spectrum is important not only to improve the speed of service, but also the quality and capacity); Comments of T-Mobile USA, Inc., WT Docket No. 09-66, GN Docket Nos. 09-157 & 09-51, at 17-20

As Chairman Genachowski stated just a few months ago, “Mobile data usage is not just growing, it’s exploding.”^{6/} There has been a 690 percent increase in the use of smart cell phones in the United States since 1998, with smart phone sales expected to overtake standard mobile phones by 2011, and mobile data is also growing at a rate of about 129 percent per year.^{7/} These smart phone applications and others provided on wireless Internet devices require more bandwidth than do standard mobile phones. A single YouTube viewing consumes nearly 100 times as much bandwidth as a voice call, and video is expected to account for half of all mobile broadband traffic by 2015 (up from a third in 2009).^{8/} T-Mobile’s own experience with smart phones illustrates similar trends. For example, since T-Mobile began offering its G1 smart phone, customers of that device use 50 times the data of the average T-Mobile customer not operating on a smart phone device.^{9/}

While consumer demand for mobile broadband will continue to skyrocket as customers increasingly use Internet, video, and other bandwidth-intensive applications (*e.g.*, via air cards that connect to laptops and netbooks, as well as smart phones), the spectrum available to support them has not.^{10/} Unfortunately, as noted by the Commission, there is only approximately 50

(filed Sept. 30, 2009) (asserting that access to additional spectrum is critical to wireless innovation and competition) (“T-Mobile Wireless Innovation Comments”).

^{6/} Hon. Julius Genachowski, Chairman, FCC, “America’s Mobile Broadband Future,” prepared remarks, International CTIA Wireless I.T. & Entertainment, San Diego, CA, at 5 (Oct. 7, 2009).

^{7/} Press Release, Federal Communications Commission, *FCC Identifies Critical Gaps in Path to Future Universal Broadband*, Nov. 18, 2009, at 2; *In Spectrum Reclamation Proposal, Broadcasters Want to Know, How Much?*, TELEPHONYONLINE.COM, Dec. 3, 2009.

^{8/} Holman Jenkins, *The Coming Mobile Meltdown*, WALL ST. J., Oct. 13, 2009; *Laptops and Netbooks: Mobile Broadband Traffic Across Regions 2009-2017*, Coda Research Consultancy, Sept. 2009.

^{9/} *See, e.g.*, T-Mobile National Broadband Plan Initial Comments at 14.

^{10/} *See, e.g.*, T-Mobile NBP Public Notice #6 Comments at 9-13 (forecasting T-Mobile’s need for more spectrum in order to meet business projections of future consumer demand).

MHz of spectrum available for assignment today.^{11/} As Chairman Genachowski has observed, “the FCC in recent years has authorized a 3-fold increase in commercial spectrum[, but] the problem is many anticipate a 30-fold increase in wireless traffic.”^{12/} More recently, along the same lines, he noted that “the record [in this proceeding] contains powerful evidence that the demand on our commercial mobile spectrum is on a course to outstrip the supply. This means that we’ll need to pursue policies to promote greater spectrum and device efficiency and ensure there is sufficient spectrum for mobile broadband.”^{13/}

Without adequate spectrum resources, moreover, the United States will lag behind other countries in broadband use and penetration, threatening the country’s competitiveness and inhibiting prospects for a full economic recovery.^{14/} Demand for and investment in mobile broadband technologies are rising in other countries. Experts predict that mobile phones will be the primary means of Internet access worldwide by 2020, and the sole means of access for a

^{11/} See, e.g., *In Spectrum Reclamation Proposal, Broadcasters Want to Know, How Much?*, TELEPHONYONLINE.COM, Dec. 3, 2009.

^{12/} Hon. Julius Genachowski, Chairman, FCC, “America’s Mobile Broadband Future,” prepared remarks, International CTIA Wireless I.T. & Entertainment, San Diego, CA, at 5 (Oct. 7, 2009).

^{13/} Hon. Julius Genachowski, Chairman, FCC, “Prepared Remarks on National Broadband Plan,” FCC Open Agenda Meeting, Washington, D.C. (Dec. 16, 2009); see also John Eggerton, *FCC Chairman Puts Focus on Spectrum*, BROADCASTING & CABLE, Dec. 16, 2009 (reporting Chairman Genachowski stating that with respect to the spectrum shortage, there “is not a lot of mystery around what is on the spectrum chart” and that the data on mobile broadband use from wireless companies, combined with the anticipated use “number of different players expect,” plus the laws of physics, “is what creates the challenge . . . [f]rom everything we’ve seen, there is no more important area of potential for the country in terms of our global competitiveness”).

^{14/} See, e.g., Donny Jackson, *FCC Seeks Comment on TV Spectrum Ideas*, URGENT COMMUNICATIONS, Dec. 3, 2009 (reporting a study conducted by the International Telecommunications Union showing that wireless carriers in the U.S. need an additional 800 MHz of spectrum by 2015 to meet the demand for broadband services and remain globally competitive); Amy Schatz, *FCC Seeks Revamp of Phone Subsidy*, WALL ST. J., Dec. 1, 2009 (reporting Chairman Genachowski stating that “[t]o be the global leader in innovation 10 years from now, we need to lead the world in wireless broadband”).

majority of people.^{15/} It is also estimated that bringing mobile broadband to developing economies could increase gross domestic product by \$300 billion to \$420 billion and create approximately 10 to 14 million jobs.^{16/} On the investment side, the Organisation for Economic Co-operation and Development (“OECD”) reported that telecommunications investment reached \$185 billion in 2007 for its member countries (with much of that investment directed toward mobile broadband networks and technologies), and that telecommunications companies are commonly among the largest private investors in their respective economies.^{17/} It is therefore imperative that the U.S. take action now to maintain its position as a leader in telecommunications policy and wireless innovation.

II. REALLOCATING SOME BROADCAST FREQUENCIES TO WIRELESS BROADBAND WILL ENSURE THAT THIS VALUABLE RESOURCE IS PUT TO ITS HIGHEST AND BEST USE

A. Technology and Marketplace Changes Since the Mid-1990s Warrant a Fresh Look at the Allocation of 6 MHz of Spectrum to Each Broadcaster in the Valuable 700 MHz Band

In the mid-1990s, when the broadcast allocation was most recently affirmed, many questioned the wisdom of providing such a significant amount of spectrum – more than necessary to continue to provide video programming – at no cost to the broadcast services.^{18/}

^{15/} Janna Quitney Anderson & Lee Rainie, *The Future of the Internet III*, Pew Internet and American Life Project, at 5 (2008).

^{16/} Sören Buttkereit, *et al.*, *Mobile Broadband for the Masses: Regulatory Levers to Make it Happen*, McKinsey & Company (2009), available at <http://www.gsmworld.com/documents/25032009113456.pdf>.

^{17/} See Organisation for Economic Co-operation and Development, *OECD Communications Outlook 2009*, at 13 (Aug. 2009), available at <http://browse.oecdbookshop.org/oecd/pdfs/browseit/9309031E.PDF>.

^{18/} See, e.g., Bob Dole, *Giving Away the Airwaves*, N.Y. TIMES, March 27, 1997 (“In just a few days, the F.C.C. is going to give away the first broadcast licenses for digital television to broadcasters for absolutely nothing. . . . We don’t give away trees to newspaper publishers. Why should we give away more airwaves to broadcasters?”); Drew Clark, *Spectrum Wars*, TECH. DAILY, Feb. 18, 2005 (“The bottom line is that the war over the airwaves has continued to drag on because generations ago, the government handed out valuable frequencies to broadcasters for free . . .”).

Congress therefore gave the Commission a statutory obligation to revisit its decision to allocate spectrum to the broadcasters: Section 336(g) of the Communications Act instructs the Commission to conduct (1) an assessment of alternative uses of the spectrum used for advanced television broadcasts and (2) an evaluation of the extent to which the Commission may be able to reduce the amount of spectrum assigned to advanced television broadcast licensees.^{19/} The intervening growth of wireless services and alternative delivery mechanisms for video entertainment clearly warrants a reassessment of the amount of spectrum allocated to broadcasting.

Even in 1996, there was a recognition that broadcasters did not need an entire 6 MHz channel to provide a digital television signal. Congress therefore authorized the FCC to permit broadcasters to use their digital frequencies to provide “ancillary or supplementary services,” provided they continued to “serve the public interest, convenience, and necessity.”^{20/} But if the decision to provide 6 MHz of spectrum to broadcasters was speculative in 1996, market developments since then have made clear that there are higher and better uses for at least some of that spectrum than broadcasting or even “ancillary or supplementary services.” The use of mobile broadband services and bandwidth-intensive applications has exploded, and the country’s dependency on over-the-air broadcasting has declined in favor of new delivery media.

The Commission itself has noted that over-the-air television viewership has declined by 56 percent since 1998.^{21/} The decline of over-the-air broadcasting is due in part to the ability of U.S. consumers to choose from a wide array of programming services and technologies.

^{19/} Public Notice at 2 (Question A.7).

^{20/} 47 U.S.C. § 336(a), (d). The Commission subsequently adopted rules requiring, *inter alia*, that each broadcaster must “transmit at least one over-the-air video program signal at no direct charge to viewers on the DTV channel.” 47 C.F.R. § 73.624.

^{21/} Press Release, Federal Communications Commission, *FCC Identifies Critical Gaps in Path to Future Universal Broadband*, Nov. 18, 2009, at 2.

Broadcasting is no longer central to Americans' reception of video programming. Over 80 percent of the nation's households subscribe to cable or satellite services and consequently generally do not use over-the-air broadcasting to watch television content.^{22/} The case for dedicated broadcast spectrum has been reduced "by rapid and fundamental changes in the market, such as: rising pay-TV adoption; rising broadband adoption; fragmentation of viewing across many channels; improving data compression; and the economic realignment of the industry."^{23/}

Viewing video entertainment over the Internet is also quickly gaining popularity, with the amount of time Americans spend on video sites growing 339 percent since 2003.^{24/} A study conducted by The Nielsen Company further found that unique viewers of online video grew 10 percent in the last year; the number of streams delivered by YouTube, Hulu, MySpace, and sites owned by the major television networks increased 41 percent; the number of video streams delivered per user has grown 27 percent; and the total number of minutes users spent engaged with online video rose by 71 percent.^{25/} In 2006, in fact, YouTube consumed as much bandwidth as the entire Internet consumed in the year 2000.^{26/} While YouTube continues to be a significant source of online video, Hulu, which generally provides longer form videos such as network

^{22/} See Donny Jackson, *FCC Seeks Comment on TV Spectrum Ideas*, URGENT COMMUNICATIONS, Dec. 3, 2009.

^{23/} *The Limits to Terrestrial Television's Case for Further Spectrum*, Human Capital, at 8 (Feb. 2009).

^{24/} See Jeff Bressler, *Nielsen Study Shows Explosive Growth in Internet Video*, CEOWORLD, July 16, 2009.

^{25/} *Id.*

^{26/} See Steve Lohr, *Video Road Hogs Stir Fear of Internet Traffic Jam*, N.Y. TIMES, March 13, 2008.

television programs, “continued its explosive growth trajectory, increasing 490 percent in total streams year-over-year, from 63.2 million in April 2008 to 373.3 million in April 2009.”^{27/}

Not only have many consumers migrated away from over-the-air television, the broadcast spectrum today is underutilized, even for delivery of video programming. Most broadcasters only use a portion of the 6 MHz allocated to them,^{28/} and very few broadcasters actually use the spectrum for the “ancillary or supplementary services” that Congress permitted. Broadcasters even lag in the deployment of mobile digital television, having only recently approved adoption of the Advanced Television Systems Committee (“ATSC”) Mobile DTV Standard and having taken few if any steps toward the inclusion of mobile television technology into wireless handsets.^{29/}

Moreover, customers are demanding television content when and where they want it, rather than on a schedule set by the broadcast networks. For example, in the first quarter of 2009, nearly 80 million people watched some amount of time-shifted television, which represents an increase of approximately 40 percent over the course of one year.^{30/} The rising popularity of Internet television described above provides further evidence that consumers are increasingly demanding one-to-one downloads of video content. The traditional broadcast model is ill-suited to serve this consumer trend.

^{27/} *Hulu’s Explosive Growth Continues; YouTube Still No. 1 in Streaming Video Arena*, ADWEEK, May 14, 2009.

^{28/} *See, e.g., Spectrum Reclamation Proposal, Broadcasters Want to Know, How Much?*, TELEPHONYONLINE.COM, Dec. 3, 2009 (noting that it’s “certainly true” that many broadcasters are not using the full 6 MHz of spectrum they were given and that it is likely that not every broadcaster in every market needs 19.4 Mbps bit stream).

^{29/} Glen Dickson, *Mobile DTV Standard Approved*, BROADCASTING & CABLE, Oct. 16, 2009.

^{30/} Mike Shields, *Nielsen: TV Watching Soars, But So Does Time Shifting*, ADWEEK MEDIA, May 20, 2009; *see also* Jennifer LeClaire, *Online TV Viewing Approaches the Mainstream*, NEWSFACTOR.COM, Sept. 5, 2008 (“The growing movement toward watching TV online is attributable, in part, to schedule-bucking viewers who want to watch the shows they want to watch when they want to watch them.”).

B. While the Economic Value of Using Spectrum for Broadcast Services Has Declined, It Has Risen for Wireless Broadband Services

The economic value of using spectrum for mobile broadband far surpasses the use of such spectrum for over-the-air broadcast services. As recently mentioned on the FCC's National Broadband Plan blog, "no other current commercial usage of spectrum delivers as much economic value as wireless broadband service."^{31/} For example, the market value of the television spectrum if used for wireless broadband is estimated at anywhere from \$64 to \$100 billion, while that spectrum is worth only about \$12 billion if it remains devoted to over-the-air broadcasting.^{32/} Former FCC Chairman Michael Powell stated recently, "In my opinion, this country is way overinvested, spectrum-wise, in broadcasting."^{33/} An analysis by the Brattle Group similarly warns that "[s]ignificant unmet demand for radio spectrum – and the services not provided as a result – represent enormous welfare losses to society."^{34/}

In the words of the current Chairman, "In order to support the full flowering of innovation, and to keep the U.S. globally competitive, we will need to find ways to free up new spectrum to mobile broadband . . . This will require examining old allocation decisions – often decades-old – and evaluating them against current technologies and consumer demand."^{35/}

^{31/} Phil Bellaria, Director, Scenario Planning, Omnibus Broadband Initiative, Blogband Spectrum Posting, Sept. 23, 2009, <http://blog.broadband.gov/?authorId=10475>.

^{32/} Amy Schatz, *FCC Seeks Revamp of Phone Subsidy*, WALL ST. J., Dec. 1, 2009; Kim McAvoy, *Hazlett Urges Spectrum Reallocation*, TVNEWSCHECK, Dec. 21, 2009 (estimating the value of the broadcast spectrum at over \$100 billion if used for wireless services).

^{33/} Matthew Lasar, *Broadcasters Fighting Back Against Wireless Spectrum Reform*, ARS TECHNICA, Nov. 17, 2009.

^{34/} *Id.*

^{35/} Marguerite Reardon, *FCC's Plans Take from Peter to Pay Paul*, CNET NEWS, Dec. 2, 2009; see also Hon. Julius Genachowski, Chairman, FCC, "Prepared Remarks on National Broadband Plan," FCC Open Agenda Meeting, Washington, D.C. (Dec. 16, 2009) ("[B]roadband is the future of mobile, [and] mobile must be a critical piece of our broadband strategy. There may be no greater spur to America's global competitiveness.").

T-Mobile recognizes that broadcasters provide a valuable service to a segment of the American public, and it is not suggesting that all television frequencies be repurposed. There is little question, however, that broadcasters can continue to provide their services over a considerably smaller swathe of the spectrum. The Commission has an obligation to ensure that spectrum is dedicated to its highest and best use and, accordingly, should act promptly to reallocate a portion of the broadcast bands for mobile broadband use.

C. The Technical Characteristics of the 700 MHz Band Make It Particularly Useful for Providing Wireless Broadband Services in Rural Areas and in Buildings

With its “highly favorable propagation characteristics,” the television broadcast spectrum is “uniquely suited for mobile broadband applications, devices and services.”^{36/} For instance, lower frequency spectrum can transmit over longer distances than higher frequency spectrum. These favorable propagation characteristics mean that fewer transmitters are needed to cover a geographic area using a lower spectrum band than would be needed using a higher spectrum band, which is particularly valuable in providing service to rural areas.^{37/} T-Mobile estimates that build out of 700 MHz spectrum would require approximately 25 to 30 percent of the sites needed to build out AWS-1 spectrum. Using fewer transmitters allows providers to avoid antenna siting challenges and achieve significant cost savings by decreasing the cost of system build-outs, which can result in lower, more competitive service prices for consumers. Spectrum below 1 GHz also provides building penetration more reliably than spectrum above 1 GHz,

^{36/} Letter from Steve Largent, President and CEO, CTIA – The Wireless Association and Gary Shapiro, President and CEO, Consumer Electronics Association, to Chairman and Commissioners, FCC, GN Docket No. 09-51, at 2 (Nov. 17, 2009).

^{37/} See, e.g., *Unlicensed Operation in the TV Broadcast Bands, et al.*, Second Report and Order and Memorandum Opinion and Order, 23 FCC Rcd 16807, ¶ 2 (2008) (noting the desirable characteristics of spectrum below 900 MHz).

which is particularly important to enable the use of mobile broadband devices within homes and businesses.^{38/}

The results of the 700 MHz auction demonstrate the current value of spectrum in lower frequency bands for advanced wireless services. As then-Chairman Kevin Martin concluded, the 700 MHz auction was the most successful the agency had ever conducted, reporting that the auction raised a record \$19.6 billion and that “each of [the 700 MHz] blocks sold for more than AWS-1 blocks with comparable bandwidth and license areas.”^{39/} The Commission should not consider historical allocation decisions to be sacrosanct or beyond reconsideration in light of technical and market developments that were wholly unanticipated when those decisions were made.

III. REALLOCATION OF THE BROADCAST SPECTRUM TO WIRELESS BROADBAND WILL PROMOTE JOBS AND INVESTMENT

In the Public Notice, the Commission asks, “What would be the impact to the U.S. economy if insufficient additional spectrum were made available for wireless broadband deployment, in terms of investments, jobs, consumer welfare, innovation, and other indicators of global leadership?”^{40/} The short answer is that failure to allocate sufficient spectrum would deprive the nation and the economy of potent sources of jobs and investment. Conversely, reallocating the broadcast spectrum will promote jobs and investment.

^{38/} See, e.g., Robert X. Cringely, *Everything You Always Wanted to Know about the 700 MHz Auction But Were Afraid to Ask*, POPULAR MECHANICS, Jan. 24, 2008; see also Amy Schatz, *FCC Seeks Revamp of Phone Subsidy*, WALL ST. J., Dec. 1, 2009 (“Broadcasters’ airwaves are highly coveted because signals travel easily across them, through walls and around trees.”); John Eggerton, *FCC Sees ‘Opportunities’ in Reclaiming Broadcast Spectrum*, BROADCASTING & CABLE, Dec. 2, 2009 (reporting that “broadcast spectrum is considered beachfront property for wireless broadband because of its propagation characteristics”).

^{39/} Marguerite Reardon, *Assessing Success in the FCC’s 700 MHz Auction*, CNET NEWS, March 19, 2008.

^{40/} Public Notice at 1 (Question A.2).

Broadband connectivity helps stimulate local economies; “for every one percentage point increase in broadband penetration, employment expands by almost 300,000 jobs.”^{41/} Wireless carriers alone directly employ more than 268,000 people, and more than 2.4 million jobs are either directly or indirectly dependent on the U.S. wireless industry.^{42/} T-Mobile has grown its workforce to over 40,000 employees and operates 24 call centers in 16 states, 22 of which employ between 450 and 1500 people.^{43/} In particular, build out of the AWS spectrum was a significant impetus in causing T-Mobile’s employment levels grow from roughly 36,000 to 44,000 employees over the past few years.

As T-Mobile has stated before, the wireless industry is a source of continued economic growth in an era where such growth is critical.^{44/} In the past decade, the wireless services sector has grown by an average of over 16 percent while the rest of the economy has grown at a rate of less than 3 percent.^{45/} One study estimates “the value of the combined mobile wireless voice and broadband productivity gains to the U.S. economy [to be] \$427 billion per year,”^{46/} while another study estimates that new wireless broadband investments of \$17.4 billion will increase gross

^{41/} Dr. Jabari Simama, Alliance for Digital Equality, *Affordable Broadband: Empowering Communities Across the Digital Divide*, at 1.

^{42/} See Comments of CTIA—The Wireless Association, GN Docket Nos. 09-51 & 09-157, at 9 (filed Sept. 30, 2009).

^{43/} See T-Mobile National Broadband Plan Initial Comments at 8.

^{44/} See, e.g., T-Mobile Wireless Innovation Comments at 9-10.

^{45/} *Wireless’ Impact on the U.S. Economy*, at 2, attached to Ex Parte Letter from Christopher Guttman-McCabe, V.P., Regulatory Affairs, CTIA – The Wireless Association, to Marlene Dortch, Secretary, FCC, GN Docket No. 09-51, WT Docket Nos. 08-165, 08-16, 08-167, & 09-66 (filed Aug. 14, 2009); see also T-Mobile Wireless Innovation Comments at 7.

^{46/} See Roger Entner, *The Increasingly Important Impact of Wireless Broadband Technology and Services on the U.S. Economy*, A Study for CTIA – The Wireless Association, at 2 (May 2008), available at http://files.ctia.org/pdf/Final_OvumEconomicImpact_Report_5_21_08.pdf.

domestic product by \$126.3 billion to \$184.1 billion and create between 4.5 million and 6.3 million jobs within 24 months of the additional investment.^{47/}

The availability of more spectrum would allow wireless providers to increase their investment in the deployment of next generation technologies, which cannot be offered widely without additional spectrum capacity. The prospect of offering new advanced broadband services would warrant significant investment in new network infrastructure and customer equipment. Failure to make available sufficient spectrum would consequently limit investment and economic growth.

IV. NOW IS THE TIME TO BEGIN THE REALLOCATION OF BROADCAST SPECTRUM

The Commission asks what market-based or other incentive mechanisms it should consider in making television broadcast spectrum available for mobile broadband use.^{48/} The Commission possesses several tools to reallocate at least some of the broadcast spectrum to wireless broadband use. Among the issues that the FCC should begin to address in assessing which of its tools to use are the following.

Band Repacking. Contiguous spectrum will provide wireless broadband operators with the greatest latitude in selecting a technological platform for the use of reallocated broadcast band spectrum. Because broadcasters generally only require a portion of the 6 MHz allocated to them, it is likely necessary to “repack” the broadcast band in order to create the maximum amount of contiguous spectrum usable for wireless broadband. As Chairman Genachowski recently stated, “Given that spectrum can take many years to reallocate and build out, if we don’t

^{47/} See Alan Pearce & Michael S. Pagano, *Accelerated Wireless Broadband Infrastructure Deployment: The Impact on GDP and Employment*, 18 MEDIA L. & POL’Y 105, 105-106 (2009).

^{48/} Public Notice at 3 (Question D).

start the process now, we'll pay a steep price in innovation down the road."^{49/} Accordingly, the Commission should evaluate how the broadcast bands may be repacked in order to create the maximum amount of contiguous spectrum. The Commission also should consider the impact of band repacking on broadcast and consumer equipment.

Spectrum Required. While it is generally assumed that broadcasters require approximately 3 MHz of spectrum to provide digital video transmission, that figure may be overstated in light of technological advances and declining viewership.^{50/} Even if that amount of spectrum is required for high definition broadcasts, some broadcasters may not transmit in high definition, which would make it even less likely that they need or use their entire spectrum allocation. Accordingly, the Commission should review the state of broadcast technology to determine how much spectrum is necessary to meet the limited needs of broadcast services now and in the future, and then should initiate the process to reallocate any excess spectrum as fairly and expeditiously as possible. The Commission should also consider whether broadcasters could improve their spectral efficiency by transitioning to cellular-type architecture with multiple lower power transmitters that would permit frequency reuse.

^{49/} Marguerite Reardon, *FCC's Plans to Take from Peter to Pay Paul*, CNET NEWS, Dec. 2, 2009; see also John Eggerton, *FCC Chairman Puts Focus on Spectrum*, BROADCASTING & CABLE, Dec. 16, 2009 (reporting Chairman Genachowski acknowledging that "spectrum policy of this sort takes a long time").

^{50/} See, e.g., Chris Albrecht, *FCC to Broadcasters: You Gonna Use All That Spectrum?*, NEWTEEVEE.COM, Dec. 2, 2009 ("TV broadcasters currently have 6 MHz of spectrum per station and depending on the type of transmission standard use[d], they could use as little as 1 MHz per standard definition channel . . ."). Moreover, advanced (MPEG-4) compression technologies could allow broadcasters to squeeze significantly more channels into their broadcast streams, making it less likely that broadcasters will use their entire spectrum allocation in the years ahead.

Relocation Costs. While broadcasters might have little claim that they should be compensated for loss of their spectrum,^{51/} T-Mobile recognizes the role that broadcast television plays in the economy. To reduce the financial burden that reallocation may have on broadcasters, the FCC may wish to consider establishing a fund (and seeking whatever Congressional approval is required for its establishment) created by the auction of broadcast spectrum. Broadcasters could access that fund to cover the costs involved in spectrum reallocation and repacking.

Additional Compensation. The Commission should also consider whether to compensate broadcasters for the spectrum they would relinquish in a reallocation. One approach to determining the amount of such compensation would be a two-sided auction for the reclaimed broadcast spectrum. In a two-sided auction, incumbent licensees may participate if they choose.^{52/} In exchange for contributing their spectrum, incumbents would be entitled to a portion of the auction proceeds; those licensees that contribute more spectrum would be entitled to a larger percentage of the auction proceeds.^{53/}

In this case, the Commission could permit broadcast licensees to retain as much spectrum as the Commission deems necessary to provide a broadcast service and require broadcast

^{51/} See 47 U.S.C. §§ 301, 304 (confirming that there are no private property rights in spectrum); *Red Lion B'casting v. FCC*, 395 U.S. 367, 393 (1969) (“Licenses to broadcast do not confer ownership of designated frequencies, but only the temporary privilege of using them.”).

^{52/} For a more complete discussion of two-sided auctions, see Evan Kwerel & John Williams, *A Proposal for a Rapid Transition to Market Allocation of Spectrum*, Federal Communications Commission Office of Plans & Policy Working Paper No. 38, at 16-19 (Nov. 2002), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228552A1.pdf (“*Kwerel Article*”).

^{53/} As the Commission has noted, there are several different methods by which two-sided auctions may be structured. See *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, et al.*, Notice of Proposed Rule Making, Fourth Further Notice of Proposed Rule Making, and Second Further Notice of Proposed Rule Making, 21 FCC Rcd 9345, ¶ 58 (2006). While the Commission has proposed (although not adopted) a methodology under which incumbent licensees may receive licensing credits to use or trade, the use of cash compensation has also been suggested. See *Kwerel Article* at 22.

licensees to relinquish the remainder. Broadcast licensees then would be compensated for the amount of spectrum they relinquished (based on a MHz/pop formula derived as a result of the auction of the broadcast spectrum). Licensees could, therefore, make the economic choice to relinquish all or part of their spectrum. As part of such a two-sided auction, the Commission could structure spectrum availability so that it could be purchased in “blocks” appropriate for different services, allowing auction participants and incumbents the flexibility to secure the spectrum for the service they propose to provide. There may be other methods for compensating the broadcasters; the Commission can and should consider various alternatives that would encourage the broadcasters to participate in a reallocation plan.

CONCLUSION

As Chairman Genachowski recently stated:

For the next decade and beyond, the mobile revolution that is now underway can be a major driver of job creation, economic growth, and innovation. It can be a key part of the solution to vital national challenges like education, health care, energy efficiency, public safety and information delivery. Our commitment to mobile broadband will determine just how much of this promise America realizes. But as we’ve learned over the course of the broadband plan process, to ensure a bright mobile future for our country we will need to focus on spectrum, one of our country’s most important assets.^{54/}

The soaring public demand for mobile broadband services (including bandwidth-intensive applications), the recognized shortage of spectrum to satisfy demand, the unique nature of the broadcast spectrum to satisfy those burgeoning requirements, and the diminished role of broadcast spectrum to support video services all mean that the Commission should evaluate the

^{54/} Hon. Julius Genachowski, Chairman, FCC, “Prepared Remarks on National Broadband Plan,” FCC Open Agenda Meeting, Washington, D.C. (Dec. 16, 2009).

reallocation of broadcast spectrum for wireless services at the earliest possible date in order to ensure, in the words of the current Chairman, “a bright mobile future for our country.”

Respectfully submitted,

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