Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington DC 20554

In the Matter of	)	
	)	
Spectrum for Broadband	)	GN Docket Nos. 09-47, 09-137
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51

COMMENTS — NBP PUBLIC NOTICE #6

THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC. AND THE NATIONAL ASSOCIATION OF BROADCASTERS

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October 23, 2009

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The Association for Maximum Service Television, Inc. ("MSTV")[1] and National Association of Broadcasters ("NAB")[2] welcome the Commission's attention to spectrum management as it crafts the national broadband plan. The ultimate beneficiaries of sound spectrum management are consumers, who rely upon the services, such as public safety, broadcasting, and wireless broadband, that are delivered over the Nation's spectrum resource.

INTRODUCTION AND SUMMARY

Most recently, the transition to digital television ("DTV") highlighted the benefits of sound spectrum management. The multi-billion dollar investments by broadcast television stations, equipment manufacturers, the government, and consumers have enabled the intensive use of each television station's 6 MHz channel to deliver a variety of high definition ("HD") and multicast programming, mobile DTV, and other ancillary and supplemental services — all while freeing up more than 100 MHz of spectrum for wireless broadband and other new commercial

[1] MSTV is a nonprofit trade association of local broadcast television stations committed to achieving and maintaining the highest technical quality for the local broadcast system.

[2] NAB is a trade association that advocates on behalf of local radio and television stations and also broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.

and public safety uses. Based upon their experience with the DTV transition and knowledge of spectrum issues more broadly, MSTV and NAB respond herein to the specific questions raised in the Public Notice, "Comment Sought on Spectrum for Broadband" (the "Public Notice").[3]

At the outset, and in response to the emphasis of the Public Notice on the supposedly "prime" bands below 3.7 GHz, MSTV and NAB urge the Commission to consider *all* frequencies that may be suitable for wireless broadband. Any bias in the spectrum inquiry to frequencies below 3.7 GHz will not provide an accurate assessment of available spectrum for broadband. Indeed, the Commission has allocated spectrum for a variety of wireless services, including broadband applications, on frequencies above 3.7 GHz (*e.g.*, the unlicensed allocation in the 5.7 GHz band).

In addition, and as described below, as the Commission considers spectrum management in the context of the national broadband plan it should bear in mind that:

- Ensuring the efficient use of spectrum already allocated and suitable for wireless broadband should be a priority. Even in the bands below 3.7 GHz, over 500 MHz of spectrum has been made available in recent years for wireless broadband, but for the most part this spectrum has only begun to be put into productive use. In addition, with improvements in technology, architecture and system design, wireless licensees can substantially improve capacity of services provided over their legacy spectrum assignments.
- In assessing the efficiency and productivity of a current use of spectrum, the Commission should put a premium on public policy goals that are served by that use. For example, in addition to economic benefits, broadcast television serves core public interest goals such as local journalism, universal service, availability of educational programming, and timely and reliable provision of emergency information.
- While wireless platforms clearly have a role in the national broadband plan, they should not be viewed as substitutes for wireline service. Wireline methods of

[3] *Comment Sought on Spectrum for Broadband*, NBP Public Notice #6, DA 09-2100 (rel. Sept. 23, 2009) ("Public Notice"). As requested, these comments adhere to the organization and structure of the questions in the Public Notice.

delivering broadband access, such as fiber to the home, are not subject to the throughput limitations that will naturally affect wireless broadband systems.

- The Commission should reject spectrum reallocation proposals that would strand substantial investments by consumers in receiving equipment, and/or leave consumers without access to service upon which they regularly rely.

Question 1: What is the ability of current spectrum allocations to support next-generation build-outs and the anticipated surge in demand and throughput requirements?

Many of the spectrum bands allocated for advanced telecommunications services such as wireless broadband have yet to be put into use. Ensuring the efficient use of existing spectrum allocations should be a priority for the Commission as it considers the role of spectrum management in broadband deployment.

First and foremost, in recent years, a significant amount of exclusively licensed spectrum has been repurposed in anticipation of the spectrum needs of the commercial wireless industry. Owing to a host of variables, these bands have only begun to be put into use.

Significant spectrum for broadband is available even if one were to accept the incorrect notion that wireless broadband deployment depends upon access to spectrum below 3.7 GHz. The following chart depicts the exclusively licensed spectrum bands below 3.7 GHz that will provide for significant, new wireless broadband deployment by commercial providers in the coming years.

Band (MHz)	Amount (MHz)	Description
698-746	48	Lower 700 MHz band made available by completion of DTV transition on June 12, 2009
746-763, 776-793, 805-806	34	Upper 700 MHz band made available by completion of DTV transition on June 12, 2009
1525-1544, 1545-1559 / 1626.5-1645.5, 1646.5-1660.5	46	L-band allocated for MSS/ATC
1610-1617 / 2483.5-2495	19	Big LEO band allocated for MSS/ATC

1710-1755 / 2210-2165	90	AWS-1 band being made available by relocation of federal government licensees
1915-1920/1995-2000 2020-2025/2175-2180	20	AWS-2 band, being made available in part by relocation of broadcast auxiliary service
2000-2020 / 2180-2200	40	2 GHz band allocated for MSS/ATC, being made available in part by relocation of broadcast auxiliary service
2155-2175	20	AWS-3 band awaiting service rules and auction
2500-2690	190	BRS/EBS band made available by repurposing of ITFS/MMDS service[4]
TOTAL	**507**	

Notably, the spectrum depicted above is in addition to the substantial amount of unlicensed and "licensed-lite" spectrum that has been made available for broadband. For example, in 2005 the Commission adopted rules to make nationwide licenses for wireless broadband available on a non-exclusive basis in the 3650-3700 MHz band.[5] That band, however, has yet to be put into intensive use for wireless broadband. An additional 109.5 MHz of spectrum that is suitable for wireless broadband is currently allocated for unlicensed use in bands below 3.7 GHz. In the nearby 5.7 GHz band, another 125 MHz of unlicensed spectrum is allocated and suitable for wireless broadband. Altogether, these unlicensed spectrum allocations provide 284 MHz of spectrum suitable for wireless broadband.[6] Moreover, this total does not

[4] Clearwire Corp. has initiated service in this band, but rollout has been limited thus far to approximately two dozen markets.

[5] *See* Wireless Operations in the 3650-3700 MHz Band, *Report and Order and Memorandum Opinion and Order*, 20 FCC Rcd. 6502 (2005).

[6] The following bands are currently allocated for unlicensed or "licensed lite" operation: 902-928 MHz, 2400-2483.5 MHz, 3650-3700MHz and 5700-5825 MHz.

include the spectrum that may become available as a result of the Commission's decision to allow the use of unlicensed devices in the television broadcast bands.[7]

In addition to making use of spectrum that has recently been made available for wireless broadband, wireless licensees can add capacity for broadband by improving the technology, architecture and system design currently deployed over their legacy spectrum bands. History has demonstrated that the deployment of more efficient technology has the potential to provide a meaningful increase in the capacity per unit of spectrum available to a wireless licensee. According to AT&T Inc., although having had until recently "only a fraction of spectrum available in other industrialized countries," commercial wireless providers in the U.S. "serve more customers and carry vastly more traffic" than providers in other countries.[8]

Despite the gains that the commercial wireless industry has made in spectrum efficiency over the years, it is clear that additional and substantial gains are possible.[9] As the Public Notice explains, a 2004 study sponsored by the National Science Foundation found that less than 20 percent of the frequency bands below 3 GHz were in use over the course of a business day.[10] In addition to peaks and valleys in spectrum use throughout the day, wireless

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[7] *See Second Report and Order and Memorandum Opinion and Order*, 23 FCC Rcd 16807 (2008).

[8] *See, e.g.*, Comments of AT&T Inc., GN Docket Nos. 09-51, 09-157, at 78-79 (Sept. 30, 2009).

[9] The closed-architecture nature of most commercial wireless systems, in which the licensee has control both over the transmission and reception equipment, facilitates equipment-based gains in efficiency. In contrast, in open-architecture systems, such as broadcast television, the licensee (*i.e.*, television station) has no control over the reception equipment (*i.e.*, digital television receivers, digital-to-analog converter boxes) used by consumers.

[10] Public Notice at 4, *citing* Comments of the New America Foundation et al., GN Docket No. 09-51, at i (June 8, 2009). Notably, broadcast television stations transmit across their entire 6 MHz channel allotments on a continuous basis; thus, broadcasters' spectrum assignments are not (continued…)

licensees in some cases do not serve the entire area covered by their licenses; this situation is especially prevalent in rural areas. Such practices may need to change to ensure that wireless licensees are making full use of the public's spectrum resource. In any event, given these efficiency concerns, it would be premature at best to increase the allocation of spectrum to commercial wireless uses by 300 percent over the current allocation, as some parties have suggested in recent filings.[11] Targeting instead a 300 percent increase in efficiency of existing spectrum use would be a more appropriate exercise.[12]

Question 3: What spectrum bands are best suited to support fixed wireless broadband?

Fixed wireless broadband access can be provided efficiently over higher-frequency spectrum, such as that widely available in the 5 GHz band and as high as the 70/80/90 GHz band. Because of their shorter propagation characteristics, these higher-frequency bands may be less desirable for some mobile applications or other services (like broadcasting) for which the location of receiving equipment is unknown and subject to change. Yet in the case of a fixed service, the location of both the transmitting antenna and the receiving antenna is known

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subject to the peaks and valleys that leave spectrum assigned to many wireless services underutilized at points in the day.

[11] *See, e.g.*, Comments of CTIA - The Wireless Association, GN Docket Nos. 09-175, 09-51, at 73 (Sept. 30, 2009) (asserting that, in addition to the approximately 450 MHz of spectrum already allocated to terrestrial wireless services, the U.S. government should "launch an effort to identify and allocate at least 800 MHz of additional spectrum for licensed commercial wireless use within the next six years").

[12] The recently-concluded transition to digital television also highlights the benefits of investing in spectral efficiency. Through the multi-billion dollar transition to digital television, broadcasters increased throughput over each television station's 6 MHz channel by 400 or 500 percent. These gains in efficiency have enabled broadcasters to launch, among other new services, a new mobile DTV service. At the same time, broadcasters decreased by 25 percent their use of spectrum.

to the broadband provider — making it possible at all times to achieve line of sight between the two antennas. Moreover, these shorter propagation characteristics allow for more efficient cell sites and spectrum re-use.

In any event, as the Commission considers the spectrum needs of fixed wireless broadband services, it should bear in mind that wireless broadband access is not a substitute for wireline broadband access. Wireline methods of delivering broadband access, such as fiber to the home, are not subject to the throughput limitations that will naturally affect wireless broadband systems. Accordingly, the Commission should look to wireless broadband services as a complement to wireline service, with wireless service relied upon as the primary means of access in those rural areas where wireline services are not economically viable (even with public support) or are otherwise unavailable.

Question 4: What are the key issues in moving spectrum allocations toward their highest and best use in the public interest?

a. How should we define and determine the value (e.g., financial, economic, and public interest) of different uses to evaluate whether spectrum usage is maximizing the public interest? How should the Commission define what it means to use spectrum efficiently and productively in the public interest? How should we determine that the public interest would be better served by reallocating spectrum from an existing service to wireless broadband service? How should we think about different types of incentives to licensees to ensure the spectrum allocated to them is used in ways that maximize its public value?

In assessing the efficiency and value of a current use of spectrum, the Commission should put a premium on public policy goals that are served by that current use. Spectrum management decisions that turn solely on the financial value of a reallocation — either in terms of the revenue that may be obtained at auction or the revenue that a new licensee may

earn through sale of services over that spectrum — will fail to uphold the Commission's obligation to base allocation decisions on the public interest.[13]

Spectrum allocated to public safety communications provides a good example of this principle. Evaluating the "value" of public safety communications based solely on the revenue obtained through these communications, or their spectral efficiency on a day-to-day basis, would lead in all likelihood to a widescale reallocation of public safety spectrum to the commercial wireless industry. Yet such an approach to spectrum management would fail terribly to serve the public's interest in a robust and reliable public safety communications infrastructure. The notion that some spectrum uses cannot be measured in dollar value alone reflects the principle of "public goods" or "positive externalities," which economists have long recognized as important and valid, and which Congress has repeatedly recognized in the spectrum management principles it has mandated for the Commission.[14]

Broadcast television likewise provides public goods. Over-the-air broadcasting reaches virtually every household in America, and is engineered to serve core public interest goals such as local journalism, universal service, diversity, competition, local economic activity, availability of educational programming, and timely provision of emergency information. If

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[13] *See* 47 U.S.C. § 303(c) (requiring that allocation decisions be based upon findings of "public interest, convenience, or necessity").

[14] *See, e.g.*, Brett M. Frishmann, *An Economic Theory of Infrastructure and Commons Management*, 89 Minn. L. Rev. 917 (2004-05); Thomas W. Merrill, *Economics of Public Use*, 72 Cornell L. Rev. 61, 74 (1986-87) ("Moreover, one can say that any activity that generates positive externalities — keeping one's lawn mowed, for example — shares the quality of public goods."); 47 U.S.C § 307(b) ("In considering applications for licenses, and modifications and renewals thereof, when and insofar as there is demand for the same, the Commission shall make such distribution of licenses, frequencies, hours of operation, and of power among the several States and communities as to provide a fair, efficient, and equitable distribution of radio service to each of the same."); *id.* at § 151.

these objectives were not a factor, the television broadcast service would have different technical and economic characteristics; among other points, it likely would not be free and available to all Americans, especially in more sparsely populated areas. Thus, as in the public safety context, to ignore the public policy goals underlying the television broadcast service would lead to spectrum management decisions that disserve the public interest.

Evaluation of the "value" of a given use of spectrum must also take into account investment in equipment and services provided over the band. In the context of television broadcasting, a significant amount of this value is in the form of investment by ordinary consumers. Consumers in 2009 have spent over $25 billion in HDTV receivers.[15] Additionally, consumers, with the support of a government subsidy, have spent billions of dollars converting their television equipment to digital television, redeeming more than 34 million coupons for digital-to-analog converter boxes. Assuming an average price of $60 per converter box, this represents an investment of more than $2 billion dollars in converter boxes alone — premised on the notion that consumers with these converter boxes would continue to receive free, over-the-air television, including new multicast services. These investments by consumers are in addition to the many billions of dollars spent by local television stations in connection with the transition to digital television.

b. Are some spectrum bands being used more efficiently and productively in the public interest than others? How can this be evaluated?

Within the spectrum below 3.7 GHz that is the focus of this Public Notice, the broadcast television bands are among the most efficient. Over the past several decades, the

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[15] *See, e.g.*, David Goetzl, *Big Picture: HDTV Sales on Upswing*, MediaPost News, Sept. 29, 2009, *at* http://www.mediapost.com/publications/?fa=Articles.showArticle&art_aid=114483 (citing estimates of SNL Kagan).

Nation's broadcast television service has made substantial advances in spectrum efficiency, all while continuing to provide a free, universal service that uniquely serves the local interests of the public.

At one time, each television station delivered a single, analog programming stream over a 6 MHz channel. Today, broadcasters use the same 6 MHz channels to deliver multiple streams of programming, including in high definition format. Broadcast television has gone from standard quality video and stereo sound to the highest quality widescreen theater quality pictures and multi-channel Dolby surround sound. The transmission standard for digital television, known as ATSC A/53, provides wide-area coverage at a data rate of almost 20 Mbps within a 6 MHz channel, making it one of the most efficient transmission systems available for disseminating high bit-rate content to a wide audience. Moreover, unlike many mobile services, each television station transmits over its entire spectrum allotment during all or virtually all of the day; there are not peaks and valleys in transmissions.

While the advances in quality and quantity of programming services represent a substantial gain in efficiency of spectrum use, broadcasters are poised to do even more with their existing spectrum assignments, offering new services like mobile DTV to complement existing programming streams. Last week, the Advanced Television Systems Committee ("ATSC") announced the adoption of the A/153 ATSC Mobile DTV Standard, which will enable broadcasters to deliver mobile DTV products and services. Adoption of this standard was the culmination of three years of intensive research and development and testing. As ATSC explained in announcing adoption of the standard, "the ATSC Mobile DTV Standard will enable broadcasters to provide new compelling services to consumers using a wide array of wireless receiving devices including mobile phones, small handheld DTVs, laptop computers and in-

vehicle entertainment systems."[16] Importantly, these services will be provided over stations' *existing* spectrum assignments, further increasing the efficiency of the Nation's over-the-air television service.

In fact, efficiency gains in television broadcasting have been accompanied by a *reduction* in the total allocation of spectrum to broadcast television, most recently through reallocation of nearly 25 percent of spectrum allocated to broadcasting at the conclusion of the DTV transition. Today, television broadcasting uses approximately 60 percent of the spectrum that it used in the 1970s[17], yet has managed to provide a four-fold improvement in the audio and video quality of its service. With the conclusion of the DTV transition, broadcast television is the first wireless service ever to substantially reduce its spectrum use while providing additional services. Meanwhile, broadcasters have worked with Sprint Nextel to transition the Broadcast Auxiliary Service ("BAS") in the 2 GHz band to a narrower, digital band plan that is making available an additional 35 MHz of spectrum for new Advanced Wireless Services and MSS.

d. What are the costs of moving current occupants and users of under utilized spectrum bands to other bands, to other technologies or solutions that do not require licensed spectrum, or consolidating use to avail under-utilized spectrum? What are the alternatives and costs of moving current users of under-utilized spectrum to different bands?

As the Commission recognized in its Notice of Inquiry in the *Wireless Innovation and Investment* proceeding, repurposing of spectrum "is done at some cost, particularly where

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[16] Press Release, *ATSC Adopts Mobile Digital TV Standard*, Oct. 16, 2009, *at* http://www.atsc.org/communications/press/2009-10-16-ATSC_approves_mobile_dtv.php

[17] Spectrum accommodations in which broadcasters have participated include vacating of television channel 1, then of television channels 70 through 83, and most recently of television channels 52-69 and the ensuing repacking of digital channels into the core television spectrum below channel 52. In addition, broadcasters are vacating 35 MHz of spectrum in the 2 GHz band through digital conversion of BAS equipment. These and other steps have accommodated commercial wireless 4G networks, mobile satellite services, land mobile communications, broadband public safety networks, and low power television services, among others.

there are incumbents with investments and infrastructure reflecting the former use of the spectrum."[18] These costs include the expense of new or re-tuned equipment, labor, disputes with new incumbents over reimbursement, and, of course, inevitable disruptions in service and delays in the implementation of new services. More importantly, where the service to be relocated is relied upon by consumers, there are substantial costs to be borne by the general public.

Indeed, in the DTV transition — which, among other goals, successfully relocated the television broadcast service out of the 700 MHz band — consumers invested tens of billions of dollars in digital receiving equipment, including digital-to-analog converter boxes. If, hypothetically, there were any further reallocation of the broadcast television service, consumers' investment in this receiving equipment would be stranded. Perhaps more importantly, consumers would lose access to the free local programming, news, weather, sports, emergency services, mobile DTV, and other programming and services previously delivered over the re-allocated spectrum.

e. What specific steps in overall spectrum management practices, if any, should we consider to ensure spectrum is fully utilized to maximize its total value? For example, should we consider evaluating licenses on their performance in utilizing their allotted spectrum during the renewal process? Should the licensee be compensated in some way for loss of the rights to that spectrum in unserved or underserved areas?

Unlike many commercial wireless services, in the television broadcast service, licensees already operate under a host of regulations to ensure that their use of the spectrum is "fully utilized to maximize its total value."[19] In the broadcasting context, the "total value" is not a strict financial measure, but rather is one that encompasses the broader public policy objectives

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[18] Fostering Innovation and Investment in the Wireless Communications Market, *Notice of Inquiry*, FCC 09-66, ¶ 28 (Aug. 27, 2009).

[19] Public Notice at 6.

described above, such as universal service, local journalism and public safety. The rules designed to ensure maximization of the "value" of broadcast spectrum range from technical matters such as coverage requirements to substantive programming obligations, such as the requirement to air programming meeting the educational and information needs of children. Compliance with these requirements is taken into account at license renewal. Thus, in contrast to some commercial wireless services for which "use-it-or-lose-it" or similar mandates may assist in driving efficient use of spectrum, the regulatory structure for broadcast television already is designed to maximize value of the spectrum resource.

Question 5. What is the ability of current spectrum allocations to support both the fixed and mobile wireless backhaul market?

As MSTV and NAB have advocated repeatedly, one way to improve broadband access in rural areas is through use of "white spaces" spectrum between television channels for fixed broadband access.[20] The white spaces presumably could have a role as well for backhaul in these areas. Because the broadcast bands are used less intensively in rural markets, with appropriate technical protections fixed broadband services can operate in this spectrum without undermining consumers' access to free, over-the-air digital television or new mobile DTV services.[21] Other parties that have addressed white-space use in connection with the national

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[20] *See, e.g.*, Joint Reply Comments of MSTV and NAB, ET Docket Nos. 04-186 and 02-380, at 5 (March 2, 2007) (supporting the introduction of fixed devices into the TV white spaces to "provide new broadband services, especially to rural and underserved areas of the United States"); Letter from David Donovan, MSTV and Jane Mago, NAB, GN Docket No. 09-51 (July 21, 2009).

[21] These protections include a prohibition on operation in the channels immediately adjacent to an occupied television channel (the "first adjacent channels"), as the Commission recognized in its *Second Report and Order* in the *TV White Spaces* proceeding. *See Second Report and Order and Memorandum Opinion and Order*, ET Docket Nos. 04-186 and 02-380, 23 FCC Rcd 16807, ¶ 10 (rel. Nov. 14, 2008).

broadband plan have noted its utility in rural areas.[22] The Canadian government has likewise authorized licensed use of television spectrum for broadband in "rural and remote" areas. That decision similarly reflects the fact that, unlike in urban and suburban areas, in rural areas there is typically sufficient white-space spectrum for fixed broadband use, including for backhaul purposes.[23]

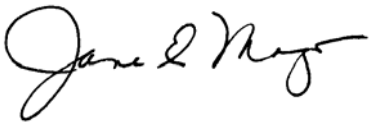
[22] *See, e.g.*, Comments of Public Knowledge, Media Access Project, the New America Foundation, and U.S. PIRG, GN Docket No. 09-51, at 32 (June 8, 2009) ("Rural areas would have more white spaces compared to urban regions due to presence of fewer broadcasting channels there"); Comments of Wireless Communications Association International, GN Docket No. 09-51, at 47 (June 8, 2009).

[23] *See* Interim Technical Guidelines for Remote Rural Broadband Systems Operating in the Band 512-698 MHz (TV Channels 21-51), Industry Canada (rel. March 2007).

CONCLUSION

MSTV and NAB urge that in connection with the national broadband plan, the Commission pursue a policy of spectrum management that encourages wireless licensees to make efficient and productive use of spectrum already allocated and assigned, and that is in harmony with the public policy goals served by existing uses of the spectrum.

Respectfully submitted,



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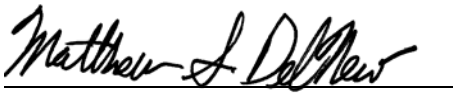

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