

**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
)	
Comments Sought on International)	GN Docket No. 09-47
Comparison and Consumer Survey)	
Requirements in the Broadband Data)	
Improvement Act)	
)	
)	
Inquiry Concerning the Deployment)	GN Docket No. 09-137
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)	

COMMENTS OF GOOGLE INC. – NBP PUBLIC NOTICE #26

Google Inc., by its attorneys, files these comments in response to the Federal Communication Commission’s Public Notice¹ seeking comment, as part of the FCC’s development of a National Broadband Plan (“NBP”),² on uses of spectrum currently licensed to broadcast television stations, in order to determine if portions of that spectrum could be repurposed for the provision of wireless broadband services.

¹ “Data Sought on Uses of Spectrum,” NBP Public Notice #26, DA 09-2528 (Dec. 2, 2009) (“NBP Public Notice #26”).

² See *A National Broadband Plan for Our Future*, Notice of Inquiry, 24 FCC Rcd. 4342 (2009).

While NBP Public Notice #26 continues to explore issues raised more broadly in NBP Public Notice #6,³ it also initiates what will be a lengthy, complex process of evaluating the benefits of reconfiguring and reallocating a single spectrum band, the broadcast television band, currently used by long-time incumbents. As NBP Public Notice #26 makes clear, the Commission fully understands that this process must balance the benefits of services provided by long-time incumbent users with other public interest benefits, including greater broadband deployment, efficient spectrum use, innovation and investment, and the needs of consumers.

Google strongly supports the Commission's efforts to identify spectrum that may be repurposed for uses that maximize spectrum efficiency,⁴ including wireless broadband,⁵ and urges the Commission to adhere to the following principles in determining whether it is in the public interest to repurpose broadcast television spectrum.

First, the effort should be data-driven, and decisions should be based on a comprehensive, fact-based record regarding existing and proposed spectrum uses. *Second*, the Commission should appropriately balance the interests of service providers, manufacturers, consumers, and other stakeholders, and promote investment and innovation by ensuring that repurposed spectrum is allocated for both licensed and unlicensed uses. *Third*, the Commission should seek to maximize efficient spectrum use and increase access to underutilized spectrum, and seek to identify market-based mechanisms wherever feasible to incent incumbents to operate more efficiently, taking fully into account competing public interest factors.

³ "Comment Sought on Spectrum for Broadband," NBP Public Notice #6, DA 09-2100 (rel. Sept. 23, 2009) ("NBP Public Notice #6").

⁴ See Comments of Google Inc. at 3, GN Dkt. 09-157 (filed Sept. 30, 2009) ("Google Wireless Innovation and Investment Comments").

⁵ See Letter of 21st Century Telecommunications, Inc., *et al.* to the Hon. Julius Genachowski, *et al.*, GN Dkt. 09-137 (filed Dec. 2, 2009).

Comprehensive, Fact-Based Record. A substantial record exists purporting to demonstrate that there is a need for additional spectrum for wireless broadband services.⁶ While Google supports efforts to determine whether, among other things, spectrum with incumbent users may be repurposed to support the needs of wireless broadband, the discussion should be informed by more than simple pronouncements that massive amounts of additional spectrum are required. Outcomes must be data-driven, and not simply based on current assumptions about what markets may look like in the future.

NBP Public Notice #26 appropriately seeks concrete data about efficient use of broadcast spectrum. For example, the Commission asks how broadcasters plan to use licensed spectrum in the future, as well as channel sharing, collocation and other techniques to improve spectrum availability and efficiency.⁷ These questions are important, but any information obtained will provide an incomplete picture. A similar inquiry should be made regarding other incumbent spectrum and service providers. As part of this effort, Google strongly urges the Commission, in the NBP, to initiate a comprehensive spectrum inventory. Google described one approach the Commission should consider in its comments on the Wireless Innovation and Investment Notice of Inquiry.⁸ The Commission must ensure that data is collected and published in a

⁶ See, e.g., Comments of CTIA - NBP Public Notice #6 at 16 (filed Oct. 23, 2009) (seeking at least 800 MHz for licensed uses); Comments of Clearwire Corp. - NBP Public Notice #6 at 4 (filed Oct. 23, 2009) (urging Commission to allocate ample spectrum for unlicensed use, alongside substantial licensed bands for broadband uses); Comments of Motorola, Inc. – NBP Public Notice #6, at 2, 8 (agreeing that significant amounts of additional spectrum are needed to accommodate broadband applications in near-term and long-term, and supporting Commission actions that promote use of unlicensed spectrum for broadband applications).

⁷ NBP Public Notice #26, at 2, 3.

⁸ Google Wireless Innovation and Investment Comments at 5-8. See also Comments of Consumer Electronics Association - NBP Public Notice #6 at 1-2 (filed Oct. 23, 2009) (“CEA NBP Public Notice #6 Comments”) (seeking a “rigorous and thorough” spectrum inventory that analyzes “actual spectrum usage on a temporal and geographic basis, the population served,

comprehensive and transparent manner. The collected data will allow all interested stakeholders – innovators and investors, the private sector and government, manufacturers, service providers and consumers – to make informed decisions about the efficient use of spectrum, other public sector resources, and private investment capital. The data also will provide support for ultimate decisions on the extent to which television broadcast and other spectrum should be repurposed for wireless broadband services.

Ensure Additional Access by Unlicensed Devices. Should the Commission ultimately determine to repurpose television broadcast spectrum, it must ensure that a substantial amount of that spectrum is designated for unlicensed use. To date, insufficient spectrum has been set aside for unlicensed uses. In *The Need for Additional Spectrum for Wireless Broadband: The Economic Benefits and Costs of Reallocations*,⁹ the author, Coleman Bazelon, notes that 22 percent, or 664 MHz, of spectrum below 3 GHz (the most valuable spectrum for wireless broadband and other mobile services) is allocated on a licensed basis.¹⁰ In contrast, less than three percent of spectrum below 3 GHz is allocated for unlicensed uses on a dedicated basis.¹¹ Moreover, other than the recently designated TV White Spaces, there is no unlicensed spectrum below 1 GHz.

whether the services provided can be offered over less spectrum or perhaps in some cases over a wired infrastructure, and to what extent allocations are serving the public interest.”).

⁹ Coleman Bazelon, *The Need for Additional Spectrum for Wireless Broadband: The Economic Benefits and Costs of Reallocations*, attached to CEA NBP Public Notice #6 Comments (“Bazelon”).

¹⁰ *Id.* at 10.

¹¹ W. Lehr, New America Foundation, Spectrum Policy Program, *Should Unlicensed Spectrum Use Be Restricted to “Spectrum Siberia”? The Economic Case For Dedicated Unlicensed Spectrum Below 3GHz at 1* (July 2004) (“*The Economic Case for Dedicated Unlicensed Spectrum Below 3 GHz*”).

The value of unlicensed spectrum compels a more balanced approach to allocations of unlicensed and licensed spectrum uses. A recent paper commissioned by Microsoft¹² discusses the economic value of unlicensed spectrum use, and finds that WiFi technologies currently provide value estimated at up to \$12.6 billion annually. The paper projects that over the next 15 years WiFi and other applications using unlicensed spectrum may generate between \$240 and \$555 billion in value.¹³ In contrast, the market value of over-the-air broadcasting currently is estimated by one analyst at approximately \$12 billion.¹⁴ Over time, it is predicted that more devices – including devices delivering mobile video – will use unlicensed spectrum than will use licensed spectrum.¹⁵

Notably, CEA, which sponsored the Bazelon paper, does not propose that all television broadcast spectrum should be repurposed solely for licensed uses,¹⁶ and numerous parties have provided the Commission with information about the value of unlicensed allocations and the need for additional unlicensed spectrum.¹⁷ Google urges the Commission to consider the economic value and other benefits of unlicensed spectrum, and to take a balanced approach to licensed and unlicensed allocations as it assesses overall wireless broadband spectrum needs.

¹² Richard Thanki, Perspective Associates, *The Economic Value Generated by Current and Future Allocations of Unlicensed Spectrum* (Sept. 28, 2009) (“Thanki”).

¹³ *See id.* at 15.

¹⁴ Bazelon at 16.

¹⁵ Thanki at 27.

¹⁶ *See* Bazelon at n.15.

¹⁷ *See, e.g.*, Comments of Clearwire Corp. - NBP Public Notice #6 at 2 (filed Oct. 23, 2009); Comments of Covad Communications - NBP Public Notice #6 at 7 (filed Oct. 23, 2009); Comments of Telecommunications Industry Association - NBP Public Notice #6 at 7 (filed Oct. 23, 2009). *See also* Reply Comments of Consumer Electronics Association at 2, ET Dkt 02-135 (filed Jul. 08, 2002) (“CEA Reply Comments”) (citing consumer benefits of additional unlicensed spectrum allocations, including greater choice, lower costs, and enhanced broadband competition).

Regardless of what action the Commission ultimately takes with respect to television broadcast spectrum, the NBP, consistent with sound long-term spectrum policy, must at a minimum affirm preservation of the current allocations for the TV White Spaces, which represent the only spectrum below 1 GHz available for use on an unlicensed basis.

Maximize Spectrum Efficiency. Competing, and potentially interfering, uses of spectrum create scarcities that dictate that sound Federal policy should promote efficient use of this valuable public resource. Chairman Genachowski has made clear that “we must promote more efficient use of spectrum”¹⁸ in order to address the gap between the demand for mobile content, applications, and services and the bandwidth available to deliver them, a gap he has referred to as “the biggest threat to the future of mobile in America.”¹⁹ There is broad consensus that use of spectrally efficient radio technologies can help bridge this gap by complementing or serving as an effective alternative to repurposing spectrum from one licensed service to another.²⁰ Increasing the transparency of and access to information about spectrum usage and availability, including through a spectrum inventory, will foster further advancements in spectrum access technologies and more efficient spectrum use.

¹⁸ Remarks of Chairman Julius Genachowski, “America’s Mobile Broadband Future,” International CTIA Wireless I.T. & Entertainment (Oct. 7, 2009).

¹⁹ *Id.*

²⁰ *See, e.g.*, Comments of Sprint Nextel – NBP Public Notice #6 at 16 (filed Oct. 23, 2009); Comments of Verizon Wireless – NBP Public Notice #6 at 6 (filed Oct. 23, 2009); Comments of Skyterra Subsidiary LLC – NBP Public Notice #6 at 6 (filed Oct. 23, 2009); Comments of MSTV/NAB – NBP Public Notice #6 at 9 (filed Oct. 23, 2009); Comments of Telecommunications Industry Association – NBP Public Notice # 6 at 7 (filed Oct. 23, 2009); Google Wireless Innovation and Investment Comments at 2.

As has been widely noted, unlicensed operations utilize spectrum efficiently while enhancing the utility and value of both wired and wireless broadband services;²¹ the spectral efficiency of WiFi systems, for example, is well established.²² Thus, in the event that TV broadcast spectrum is repurposed, the Commission should ensure that portions of the spectrum are dedicated to unlicensed use. The Commission also should seek to further maximize efficient spectrum use by re-examining its interference protection standards, promoting increased use of underlay and overlay technologies, removing unnecessary constraints on adjacent channel operations, and encouraging the use of higher quality receivers to reduce interference potential.²³ The Commission also should seek to improve the efficient use of unlicensed TV White Spaces spectrum, for example by establishing contiguous bands for operations of TV White Spaces devices. All of these actions will lead to more efficient use of valuable spectrum and increase innovations and investment in the wireless ecosystem.

Finally, Google supports the Commission's efforts to identify market-based mechanisms to encourage incumbent licensees to make more efficient use of their spectrum, and to choose whether or not to make spectrum available for reallocation to wireless broadband use.²⁴ Although many incumbent licensees already have spoken out in opposition to any discussion of

²¹ See, e.g., *The Economic Case for Dedicated Unlicensed Spectrum Below 3 GHz* at 5-7; CEA Reply Comments at 2; Comments of Motorola Inc. – NBP Public Notice #6 at 7 (filed Oct. 23, 2009).

²² The small size of WiFi cells allows for more extensive frequency re-use than licensed systems, and coverage can readily be expanded. Licensed service providers therefore have expanded the reach of their networks by incorporating WiFi technology on unlicensed spectrum. See Ruckus Wireless, *Clear Voice over Wi-Fi: Overcoming Wi-Fi Challenges Facing Digital Voice at Home* at 3 (Nov. 2006). Available at <http://www.ruckuswireless.com/whitepapers/preview/voice>.

²³ See Google Wireless Innovation and Investment Comments at 19-26.

²⁴ NBP Public Notice #26 at 3.

repurposing their spectrum, it is notable that some broadcasters appear open to considering such incentives.²⁵ As Google has discussed, these incentives can rest on novel shared uses of spectrum, such as underlays and overlays, as well as reassessing the basis of harmful interference.²⁶ All spectrum users, both licensed and unlicensed, must seek to use this finite resource more efficiently in order to promote innovation and continued economic development in a time of exponential growth in demand for spectrum.²⁷

Google commends the Commission for beginning the process of asking tough but fair questions about spectrum usage in this country. Long-term spectrum policy must be based on the very types of data the Commission is seeking in this proceeding. Google urges the Commission, as it continues to address the need for spectrum for wireless broadband services and considers all options for closing the spectrum gap, to make decisions based on a comprehensive and transparent record of spectrum usage. Those decisions should be guided by recognition of the tremendous value of unlicensed spectrum, and lead to identifying additional spectrum for unlicensed uses. Finally, the Commission should seek to promote more efficient spectrum use, including the adoption of market-based incentives.

²⁵ See Communications Daily, Oct. 30, 2009, Comments of Vincent Sadusky, Chief Executive Officer, LIN TV Corp. (“broadcasters aren’t all in agreement” on proposed repurposing of television broadcast spectrum).

²⁶ See Google Wireless Innovation and Investment Comments at 24.

²⁷ See Reply Comments of Public Interest Spectrum Coalition at 59, GN Dkt. 09-157 (filed Nov. 5, 2009).

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Respectfully submitted,



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