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SUMMARY

The Federal Communications Commission has an enormous and important task in front of it: the development of a national plan that will encourage the deployment and use of high-speed broadband networks. In forming this plan, Apple believes that the Commission must start with a clear, bold vision of the benefits broadband can bring to consumers and end-users in both their personal and professional lives. From this vision the Commission can then set aggressive goals that will guide the development of broadband networks, services and devices in the United States for years to come.

As part of this plan, Apple believes that the Commission should focus on promoting the widest availability of broadband services. The plan's first priority should be to extend broadband networks to those with no access now, while also providing for those areas and populations that are underserved. The Commission should set aggressive targets for broadband speeds—no lower than 50 Mbps for wireline networks and 4 Mbps for wireless. Given the rapid pace of technology development, Apple further recommends that these targets be updated every three years. The plan should also recognize the important role that wireless technologies will play in the delivery of broadband services, while remaining true to the principles of technology neutrality.

Finally, the Commission's plan should promote greater availability of information about broadband access services and require the development of consumer-friendly measurement tools that can be used to evaluate network capabilities and speeds. This will allow end users to understand what they are really getting, as well as how much broadband capacity they are actually using. This will help end consumer confusion about what broadband is and what they can realistically expect it to do.

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)
)
A National Broadband Plan for Our Future) GN Docket No. 09-51
)

REPLY COMMENTS OF APPLE INC.

I. INTRODUCTION

Apple Inc. (Apple) respectfully submits these reply comments in response to the Federal Communications Commission’s (Commission) April 8, 2009 Notice of Inquiry (Notice) seeking comment on the development of a National Broadband Plan (Plan or Broadband Plan).¹ The American Recovery and Reinvestment Act of 2009 requires the Commission to develop the Plan “to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal.”² The Commission’s Notice addresses a myriad of issues involved with the development of the Plan, and Apple commends the Commission on the comprehensive nature of the Notice.

¹ Notice of Inquiry, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, FCC No. 09-31 (rel. April 8, 2009).

² American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, div. B, tit. VI, § 6001(k)(2) (Feb. 17, 2009) (“Recovery Act”).

II. THE COMMISSION MUST DELIVER A CLEAR VISION FOR THE FUTURE OF BROADBAND IN THE UNITED STATES

The United States is at a crucial crossroads in the development of its future communications, information, and entertainment industries. The promise of broadband has long been touted, but now the Commission has an historic opportunity to actually help bring the promise to fruition. It is Apple's firm belief that we have not yet seen even a small part of what broadband can do; the transformative power of new broadband-enabled services, devices and applications have the potential to truly revolutionize how Americans live and work.

Out of this conviction, Apple believes that the Commission's Broadband Plan should start with a vision for the future of broadband in the United States; a vision that will be realized with the widest possible deployment and adoption of broadband services and technologies. The Plan should focus on building an information and communication infrastructure that will serve all Americans for years to come. It should be bold and forward-looking and set ambitious targets and timelines for rolling out the fastest possible broadband services to all corners of the country. As Chairman Genachowski recently commented, "now is not the time for half measures."³ Conversely, it should not have the effect of enshrining the limitations of today's networks, nor serve as a mere recognition of or justification for the broadband status quo.

As it develops the Broadband Plan, Apple urges the Commission—in keeping with the clear intent of the Recovery Act—to focus on the individual. The Plan's overall goal should be to provide access to broadband networks that will allow consumers to use

³ Remarks of Federal Communications Commission Chairman Julius Genachowski, during the FCC's Open Meeting, July 2, 2009.

the applications and services they need in their daily personal and professional lives— wherever they live or work.

Apple is concerned, however, based on the extremely specific and detailed responses of some of the commenters, that the Commission risks getting mired down in details and losing sight of this broader vision. The Commission should avoid the temptation to try to resolve every issue, barrier and problem commenters identify, and instead focus on setting the “big picture” objectives necessary to provide broadband to all Americans as quickly as possible. The Plan should set goals and timelines to reach those goals (including how the Commission plans to complete the necessary proceedings) with appropriate milestones and metrics to measure progress toward achieving its broadband vision.

III. THE BROADBAND PLAN SHOULD FOCUS ON INCREASING BROADBAND AVAILABILITY AND SPEED

A. The Commission Should First Focus on Increasing Broadband Availability

As an initial matter, Apple is heartened by the fact that most commenters seem to agree that the first priority of the Commission’s Broadband Plan should be to deploy broadband networks to those areas of the country that lack any networks at all.⁴ Commenters proffer a range of reasons for focusing on the supply side of the problem. Some highlight the potential of broadband to improve education, healthcare, and government services. Others speak to the equity issues of ensuring that all areas have access to the benefits of broadband generally. To be sure, most of the comments focus on

⁴ While satellite services might meet some users’ limited Internet access needs currently, most consumers do not view satellite services today as equivalent to other broadband services due to issues of speed, bandwidth and cost.

the overall positive social and economic benefits that will develop as a result of having as many people connected to a network as possible. Apple agrees, and believes that connecting those Americans who presently have no access to broadband services should be the Broadband Plan's highest priority, while improving access in "underserved" areas should be a close second.

1. Absent government intervention, unserved areas will likely remain unserved

Commenters point out the difficulties of reaching the most remote parts of our country: the costs of building and maintaining a network in these areas are prohibitively high, and unlikely to fall significantly enough to induce the needed private investments. This indicates that the problem of reaching America's most remote potential users cannot be solved by the market alone; government intervention is needed, and efforts must go beyond merely encouraging more competition.

Beyond the unserved areas, which should receive the highest priority under the Plan, Apple urges the Commission to also address those areas that are "underserved." In many areas of the country, where potential users may only have access to one provider, the Commission's focus should be on increasing network capacity, speeds and increasing competition.

It is also important to note that unserved and underserved areas should not be forced to trade wider availability for lower data speeds. The Broadband Plan can and should "aim high." In addition, making lower-speed broadband more widely available may lead to unintended negative consequences, such as customer dissatisfaction and low adoption rates. Customers who receive inferior data speeds may feel that they have been

misled by the promise of broadband, with their dissatisfaction reflecting badly on both providers and the Commission's Plan in general.

Apple encourages the Commission to consider a wide range of funding options in order to incent providers to build networks in rural, high-cost areas or other areas where coverage is lacking—recognizing that no one solution is likely to best address all circumstances.

2. Wireless technologies will serve an important role in meeting the objectives of the Broadband Plan

Wireless broadband, and in particular, mobile broadband, is growing quickly. In particular, the take up of broadband capable smartphones has been particularly strong. Apple, for example, sold more than 1 million of its new 3G S model iPhones in the first three days of sales in June of this year.

For consumers, this trend is not just about having the latest, fastest phone. It is clear that what is also driving recent sales and growth trends is the rapidly increasing number of applications and services that are now offered. In July 2008, for example, Apple launched its first of its kind App Store, which provides a marketplace for third party applications that users can download for use with their iPhones and iPod Touch devices. After just one year of operation, the App Store now offers more than 65,000 applications for download, and customers have already downloaded over one and a half *billion* applications. All the major smartphone vendors now have on-line stores catering to their own users. Every day users are discovering new ways that broadband can enrich and simplify their lives. This is the type of innovation the Commission's Broadband Plan should seek to encourage.

This rapid growth also indicates that, although mobile broadband speeds may not yet be as high as the fastest wireline speeds, mobile broadband is providing today's consumers with what they want most—portability. As the Commission considers its vision for broadband connectivity, it should recognize the benefits of and desire for mobility and craft policies that enable wireless broadband networks and services to continue to grow—in terms of numbers of subscribers, capacity and speed, and applications.

3. The Commission should ensure that its plan is technology neutral

Unfortunately, no technology “silver bullet” exists that will magically solve the nation's broadband problems. Different technologies have different characteristics that will enable them to play a unique role in the delivery of future broadband services. Each has advantages and disadvantages that the Commission should recognize as it considers its vision for future broadband services.

Apple agrees with those commenters that urge the Commission to remain technology neutral in its policies as it develops its vision for broadband and the Plan to implement it. The Commission, for example, should not succumb to simplistic arguments that claim one technology is better than another, or that relegate some technologies to a “complementary” position. Such an approach risks consigning these technologies to permanent second-class status, when they can, in fact, contribute significantly to overall broadband deployment and use. In particular, the Commission should not adopt policies that will disadvantage wireless vs. wireline technologies or place undue emphasis or focus on one particular technology.

The Commission's primary goal should be promoting the fastest, most reliable, and most affordable broadband *access* for all users by any technological means available. The means by which a particular user gets that access at any particular time or place is less important than ensuring that access is universally available. By maintaining a technologically neutral position, the Commission will provide companies seeking to offer broadband access with the maximum flexibility to develop networks that best match technologies to user needs, thus guaranteeing that the greatest number of people will have access to broadband at the fastest speeds they desire.

B. The Commission Should Set Aggressive Targets for “Broadband Capability” that Reflect Technology Differences

1. The Commission should set aggressive speed targets

As it considers the future of broadband in America, the Commission must take tangible, measurable steps to bring that vision into practice. An important part of doing so will be to set aggressive definitions for what constitutes “broadband capability.” Contrary to those commenters which believe that specific numbers may disadvantage particular providers, effectively mandate specific technologies, or distort competition, Apple strongly believes that setting specific goals is the only effective way to bring high-speed broadband to all who want it. Without concrete metrics against which to measure progress, the Plan will be little more than a wish list of vague, undefined goals, whose attainment will be likewise difficult to verify.

Apple also strongly believes that the current Commission definition of “basic broadband tier 1,” with a maximum speed of 768 kbps to 1.5 Mbps in the faster

direction,⁵ is much too slow to be considered broadband even today. While this definition could arguably have been considered appropriate some years ago, broadband technology has advanced rapidly, with significantly higher speed options already being offered by both wired and wireless technologies. The Commission's current definition sets the bar far too low for advancing U.S. broadband interests, given the current state of technology and what other countries are proposing for their access requirements.

2. The Plan should adopt flexible speed and capability definitions based on technology

Commenters appear to generally support flexible definitions of "broadband capability" that recognize differences in technology as well as circumstance. Apple agrees that different speed and capability definitions for broadband should be developed for different technologies because today's wireless technologies in general still have lower maximum speeds than wireline technologies. In addition, however, Apple also believes that the bias of the Commission's policies should be toward promoting the availability of higher bandwidth over time, regardless of the specific technology. Each technology will follow its own development path, and one important goal of the Commission's Plan should be to encourage all technologies to push for ever-higher speeds and capacities.

Establishing different speeds for wireline and wireless technologies, however, should not in any way convey a preference for one over the other, nor should such differentiation be seen as contradicting or undermining the Commission's commitment to

⁵ Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership, WC Docket No. 07-38, Report and Order and Further Notice of Proposed Rulemaking (2008).

technology neutrality. Technology neutrality dictates that the Commission not favor one technology over another. However, this does not mean that all technologies must be treated exactly the same in all circumstances. Establishment of different definitions (including speed) for different technologies should be done in a way that conveys no regulatory advantage; the various broadband technologies should be able continue to compete against each other based on their relative strengths and weaknesses, just as they always have.

As the Commission considers what speeds would be appropriate, Apple believes that in setting national targets we should “aim high” in order to achieve and maintain a leadership position with respect to our broadband infrastructure. Apple notes that there are networks and broadband projects now under way or proposed around the world that may give some guidance. For those countries deploying new-build fiber to the premises solutions, 100 Mbps is generally expected or required.⁶ In the United Kingdom, operators are implementing upgrade plans that range from 40-50 Mbps using various wireline technologies. Similarly, in the United States, several wireline services already offer speeds up to 50 Mbps. Given these examples, Apple would suggest that the minimum speed threshold for a wireline broadband today should be at least 50 Mbps. For wireless networks, commenters proposed a variety of speeds, most of which Apple considers too low. Apple looks to the current trends in wireless development and finds that while today’s 3G speeds may be adequate for the very short term, carriers are already working on a variety of “4G” technologies that promise significant improvements in the wireless broadband experience. Based on these developments, Apple recommends that

⁶ Australia and Singapore, for example, both specify 100 Mbps in their broadband plans.

wireless broadband capability be targeted to provide an average user speed of 4 Mbps for mobile broadband services and 10 Mbps for fixed wireless networks.

Finally, because technology capabilities will evolve over time, it is inevitable that the Commission’s definition of “broadband” will require periodic modification. The majority of commenters agree that the definition should evolve, but most do not specify a particular time period. Apple, however, believes that specifying a specific review period will give certainty to both application and service providers and network providers alike, giving them clear expectations to work from and towards. Apple suggests that an appropriate review period would be every three years.

As part of these reviews, Apple believes that it will be important to continue to “raise the bar” by establishing progressively higher targets for broadband capabilities over time. This continuous reevaluation process will thus both reflect and drive technology advances, creating a virtuous cycle of advanced technology development. The ultimate goal of these reviews—and an important objective of the Broadband Plan—should be to ensure that the United States can claim *and maintain* a position of world leadership on global measures of broadband availability, penetration, speed and bandwidth – areas where the United States has fallen increasingly behind.

IV. REALIZATION OF THE BROADBAND PLAN WILL REQUIRE INCREASED TRANSPARENCY AND EFFECTIVE MEASUREMENTS

As the Commission’s Broadband Plan is implemented, it will be critical to be able to accurately measure and assess the speeds, capacities and capabilities of the various broadband access systems as well as analyze consumer use. While our comments have focused generally on broadband capacity in terms of upstream and downstream broadband speed to the end user, the Commission should also consider gathering

sufficient data to enable more precise measurements of broadband service by factoring in such variables as latency, service uptime and network outages. Without an accurate measure of these elements, Apple believes that there will be no effective, verifiable way for the Commission to know if the Plan’s goals are being met, or any basis upon which to consider periodic revisions of the definition of “broadband.” In addition, consumers also generally have little idea how much capacity they use themselves on a real-time or monthly basis, and there does not appear to be a way at present to measure such aggregate use. Fundamentally, greater transparency is needed into today’s and tomorrow’s broadband access networks to allow consumers and the Commission to see what is going on “inside the pipes.”

Apple notes that there are really two aspects to this problem. The first involves the information that broadband access providers make available to consumers. As a result of competing advertising claims from broadband providers and general consumer misunderstanding about the difference between advertised and actual speeds, it is often difficult for consumers to determine exactly what speeds various services offer, what speeds they can realistically expect to get, and how much capacity they are using. This causes a great deal of confusion and uncertainty about exactly what services and capabilities are being provided to end users.⁷ Thus, Apple believes that more, and clearer, information should be provided to consumers, and concurs with those commenters that consider transparency and information disclosure to be essential in promoting greater broadband deployment and use in the United States. Given the

⁷ Apple notes that the *Notice* (§67) requests comment on how “consumer welfare” could be “enhanced by more disclosures to customers of any limitations that providers place on broadband services, including limitations that may be placed on service on a temporary or intermittent basis, to deal with network congestion or for other reasons.” Apple’s comments in this section are responsive to that request.

obvious benefits to consumer welfare and the importance of such information for effective management of the Plan, Apple strongly urges the Commission to make transparency and reporting requirements fundamental components of its Broadband Plan.

While transparency and greater disclosure are necessary, they are not sufficient. The even more critical factor for ensuring the Broadband Plan's objectives are met is by having a practical way to validate, and supplement, publicly-provided information on network capabilities. Apple strongly believes that there must be a way for consumers and the government to compare access networks on the basis of actual performance, not just advertising claims.

Consequently, Apple urges the Commission to consider methods and mechanisms that will allow consumers to gather real-world information on network performance and their own individual broadband use. Specifically, Apple believes that for any broadband access network, the Broadband Plan should specify appropriate tools or metrics for measuring network capacity, speeds, and usage. Real-time speed/performance measurements are necessary to allow consumers to know exactly what their provider is supplying them at any given moment, and will enable them to make sure that they are getting the capabilities and services that they subscribed to and are paying for as well as manage their individual use. In particular, this will allow users to see clearly the differences between peak and non-peak speeds and the potential effects of network management practices on their connection and services. In addition, service providers should provide tools that allow consumers to track their own broadband usage. These would include tools to accurately measure how much capacity a particular consumer is

using on a real-time basis as well as how much that consumer has downloaded and uploaded over time (e.g., during a monthly billing cycle).

In addition to the benefits such tools would offer consumers, these types of tools or metrics would also provide a way for the Commission itself to track and analyze the aggregate real-world performance of the broadband access networks and services that will be made available. Being able to determine the overall capacity of a particular network, for example, will be important for verifying that the network can, in fact, supply broadband services to its customers as promised. Such aggregated information will be vital to the Commission in evaluating progress as the Plan is implemented, and will provide invaluable data to measure our improvements against other countries' broadband development efforts.

The combination of improved transparency and information disclosure with methods and mechanisms for monitoring network performance will serve both consumers' and the Commission's needs. It will allow consumers to monitor their own broadband use and detect discrepancies between what is promised and what is actually delivered. Rather than having to rely on advertising claims, consumers will be able to make informed judgments on network capabilities and practices and about what types of broadband plans are most suitable for them based on their actual use. Disclosure and measurement requirements will also provide data to the Commission to support its national broadband access goals, as well as identify any capacity constraints facing providers, and could even provide information that would allow competing providers to differentiate themselves in the broadband marketplace.

V. CONCLUSION

As it takes the next steps to develop its Broadband Plan, Apple respectfully suggests that the Commission:

- Define a clear, bold vision for the future of broadband in the United States that will lead to the realization of the full potential of the Internet for communications, information and entertainment;
- Develop technology neutral policies that will ensure the rapid deployment of broadband networks to unserved and underserved areas;
- Set aggressive speed targets that will promote the future development of advanced wireline and wireless broadband services, and that can adapt to changes in technology over time;
- Require increased transparency into broadband networks, and establish metrics and measurements that can be used to evaluate network capacities and the speeds carriers are actually delivering to end users.

Apple appreciates the enormous amount of work that the Commission has already put into this effort, and looks forward to working with the Commission as it begins to develop specific proposals for the Broadband Plan.