Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Preserving the Open Internet	)	GN Docket No. 09-191
	)	
Broadband Industry Practices	)	WC Docket No. 07-52

COMMENTS OF T-MOBILE USA, INC.

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INTRODUCTION AND SUMMARY

T-Mobile USA, Inc. ("T-Mobile") respectfully submits these comments in response to the Notice of Proposed Rulemaking in the above-captioned proceedings (the "NPRM").[1] The rules outlined in the NPRM, if implemented, could reverse the Commission's longstanding and successful "hands off" approach to the Internet—and its successful deregulatory approach to the wireless marketplace. T-Mobile wholeheartedly agrees with the Commission's stated goal in this proceeding of preserving and promoting openness on the Internet. At the same time, regulatory intervention is not necessary to achieve that goal—particularly in the wireless broadband marketplace. The wireless retail business is characterized by sky-rocketing demand, intensive competition, widespread investment, and explosive growth in the applications and content markets. Indeed, most consumers have four or more wireless broadband providers within their own market,[2] and competition has driven providers to open their networks to an impressive array of devices and applications. T-Mobile's involvement in the Open Handset Alliance is a perfect illustration of this trend. Indeed, robust cooperation among network and "edge" providers in the wireless ecosystem is creating economic benefits and opportunities for all stakeholders and enhancing value for consumers at the retail level. In short, *without* regulatory oversight, the market itself is driving openness and supporting all of the goals articulated by the NPRM.

The Commission should be hesitant to intervene in the wireless marketplace not just because there is no need for it to do so, but because the proposed rules would create unique

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[1] Notice of Proposed Rulemaking, *Preserving the Open Internet, Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52 (Oct. 22, 2009) ("NPRM").

[2] *See generally* Thirteenth Report, *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, 24 FCC Rcd 6185 (2009) ("*Thirteenth CMRS Report*").

burdens for wireless broadband Internet services at a critical time. The NPRM itself recognizes the significant hurdles that must be overcome to provide high-quality wireless broadband service to consumers: the shortage of spectrum in the face of astonishing, continuing growth in wireless broadband demand; unpredictable demand spikes and interference issues that make capacity planning challenging; and the need to preserve high-quality voice—including emergency voice communications—while supporting new applications that consume bandwidth at unprecedented levels.[3] As Grant Castle, T-Mobile's Director for National Planning & Performance Engineering, explains in the attached declaration ("Castle Decl."), wireless providers need flexibility to make network management decisions quickly and to implement them dynamically. They cannot operate effectively or efficiently with the constant threat that network management decisions will be subject to second guessing by advocates and regulators.

In light of these challenges, the prospect of falling back on the NPRM's offer of a liberal "reasonable network management" justification does not provide the marketplace with the certainty it needs. The wireless industry is constantly evolving to new generations of technology, new service offerings, new wireless broadband uses, and increased demand. No one can predict what may or may not be needed to manage the network today, tomorrow, or thereafter. Indeed, given the different technologies, equipment, and service models that proliferate in the wireless marketplace, it would be difficult to find a common definition that encompasses all providers' diverse requirements at any given moment in time. The only

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[3] According to Rysavy Consulting, "watching a YouTube video on a mobile phone or wireless enabled laptop consumes almost one hundred times the data bandwidth of a mobile voice call. . . . Thus, within the next decade, licensing significant amounts of additional spectrum will be imperative if the United States wants its mobile operators to continue expanding and upgrading the country's wireless broadband networks." Rysavy Consulting, *Mobile Broadband Spectrum Demand* at 3 (Dec. 2008), http://www.rysavy.com/Articles/2008_12_Rysavy_Spectrum_Demand_.pdf.

outcome that would flow from the possibility that a practice will be upheld as "reasonable network management" is the certainty that the question will be litigated over and over again. This regulatory overhang will also depress investment and innovation in forward-looking network management and security-enhancement techniques and technology.

Further, the "reasonable network management" justification could threaten various carrier business models and service arrangements that that have made the wireless broadband marketplace a unique and vibrant ecosystem. Unless the Commission clarifies that all such services are managed services or are otherwise exempt from the proposed prohibitions, the NPRM's proposed rules might unwittingly undermine a host of innovative offerings carriers either offer today or may offer in the future. While the Commission may not have intended this result, pro-regulatory advocates can be expected to pursue it unless the Commission carves such arrangements out from any form of regulation.

Beyond this, the rules are likely to chill investment in wireless broadband and delay if not preclude the introduction of new services and applications that could make wireless broadband a more significant player in the larger broadband ecosystem. Both the Department of Justice and the NTIA have recently informed the Commission that achieving that goal is one of the Administration's primary objectives for this industry. And they have made clear that achieving that objective will require that the Commission provide the wireless broadband industry with more spectrum so that it can offer a full range of applications at robust speeds.[4] Likewise, the nation's Chief Technology Officer, Aneesh Chopra, described wireless spectrum as one of the "building blocks" of innovation, and a core element of the Obama Administration's plan for

[4] *Ex Parte* Submission of the U.S. Dept. of Justice, GN Docket No. 09-51, at 14, 22 (filed Jan. 4, 2010) ("*DOJ Broadband NOI Ex Parte*"); U.S. Dept. of Commerce Letter to Chairman Genachowski, FCC, GN Docket No. 09-51 at 5 (filed Jan. 4, 2010) ("*NTIA Broadband NOI Ex Parte*").

reviving the U.S. economy.[5] While more spectrum will not remove the need for ongoing, proactive network management, it will facilitate wireless carriers' ability to support a wider and more robust range of services, applications, and devices, achieving the very goals embraced by the NPRM and net neutrality advocates. And it will allow wireless providers of all sizes to transition to 4G and expand competition across the entire broadband Internet access marketplace, enriching the ecosystem and customer choice. The Commission should accordingly stay its hand from regulating the wireless broadband marketplace for now and instead focus on supporting these potentially "game-changing" developments.

ARGUMENT

I. THE WIRELESS BROADBAND INTERNET MARKETPLACE IS ACHIEVING "OPENNESS" WITHOUT THE NEED FOR REGULATORY INTERVENTION.

In support of its proposed regulations, the NPRM cites two examples of misconduct in the broadband Internet access market—the *Madison River* and *Comcast* incidents.[6] Both were quickly resolved; neither has been repeated. But what is especially relevant is that neither incident involves the *wireless* industry.[7] Indeed, the NPRM does not reference any problem in

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[5] *See Chopra, Shapiro: Spectrum Availability Among Keys to Promoting Innovation*, TR Daily, Jan. 7, 2010, 2010 WLNR 356211 ("Reviving the U.S. economy will rely heavily on promoting innovation, with one of the key areas of technological innovation being new and innovative uses of wireless broadband services, making it imperative that more spectrum be made available, according to U.S. Chief Technology Officer Aneesh Chopra and Consumer Electronics Association President Gary Shapiro.")

[6] *See* NPRM ¶¶ 32, 36-37.

[7] Moreover, neither problem relates to the new antidiscrimination rule that appears to be the Commission's primary motivation to revise and expand its Policy Statement on Broadband Internet Access. Policy Statement, *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, 20 FCC Rcd 14986, 14988 ¶¶ 4-5 & n.15 (2005) ("*Broadband Policy Statement*"). Both incidents were fully addressable under the existing policy guidelines, which includes the no-blocking and no-degradation principles.

the wireless broadband industry. This is not surprising: the wireless broadband market has, on its own, rapidly moved to embrace open systems and platforms.

Notwithstanding repeated predictions of impending crisis by various parties, the wireless broadband marketplace has become more diverse, open, and dynamic every year. For example, even as Skype called on the Commission to compel wireless providers to open their platforms to prevent a return to "walled gardens," T-Mobile and others were already in the process of developing the Open Handset Alliance and the Android platform; their launch, just nine months later, changed the face of the wireless marketplace forever.[8] Indeed, the number of third party applications available for wireless platforms appears to be racing toward multiple hundreds of thousands.

In short, real world developments in the wireless broadband market are at odds with the basis for intervention cited in the NPRM. The NPRM posits that regulatory intervention is appropriate because "broadband providers' . . . interests in maximizing profits may not always align with the interests of end users and the public."[9] This is so, the NPRM suggests, because (1) broadband service providers with market power may have the incentive and ability to engage in anticompetitive discrimination, and (2) even in the absence of such market power, competitive forces may not be sufficiently robust to eliminate incentives for an individual provider to charge inefficiently high prices.[10] But the wireless broadband marketplace already is a vigorously

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8 *See* Petition to Confirm a Consumer's Right to Use Internet Communications Software and Attach Devices to Wireless Networks, Skype Communications S.A.R.L., RM-11361, at 18 (filed Feb. 20, 2007) ("*Skype Petition*"). The Open Handset Alliance released its software developers kit for the Android platform in November of 2007. *See* Open Handset Alliance, Press Release, *Open Software Alliance Releases Android SDK*, Nov. 12, 2007, http://www.openhandsetalliance.com/press_111207.html.

9 NPRM ¶ 7.

10 *Id.* ¶¶ 67-73.

competitive retail market that continues to respond swiftly and aggressively to consumer demand—including the very clear consumer demand for openness, variety, and choice. In fact, this marketplace embodies the "virtuous cycle" of innovation and growth that has been expressly cited by the Obama Administration,[11] and the public interest will be best served by further encouraging market forces to develop it without regulation.

A. Competition Is the Core Dynamic in the Wireless Broadband Market.

The net neutrality debate began in the wireline context, premised on an alleged lack of broadband "last mile" competition. But that concern has no basis in the wireless broadband market, given the intense level of intramodal wireless retail competition.[12] As both DOJ and NTIA have recognized, wireless broadband has the potential to help resolve the concern about insufficient competition altogether by providing a robust source of intermodal broadband competition, and thus enhancing choice and opportunities for consumers and content and application providers alike.[13]

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[11] *See NTIA Broadband NOI Ex Parte* at 2. ("Indeed, the social and economic fruits of the Internet economy are the result of a virtuous cycle of innovation and growth between that ecosystem and the underlying infrastructure—the infrastructure enabling the development and dissemination of Internet-based services and applications, with the demand and use of those services and applications by consumers and businesses driving improvements in the infrastructure which, in turn, support further innovation in services and applications".)

[12] Notably, as T-Mobile has explained in other proceedings before the Commission, regulatory intervention on the wholesale side (e.g., roaming and special access) is needed to maintain the robust level of competition on the retail side. See Comments of T-Mobile USA, Inc. on NBP Public Notice # 11, GN Docket Nos. 09-47, 09-51 & 09-137, WC Docket No. 05-25, at 8-9 (filed Nov. 4, 2009); see also generally Reply Comments of T-Mobile USA, Inc., WT Docket No. 09-66, at Section III (filed July 13, 2009); Comments of T-Mobile USA, Inc., WT Docket No. 09-66, GN Docket Nos. 09-157 & 09-51, at Section III (filed Sept. 30, 2009).

[13] *DOJ Broadband NOI Ex Parte* at 8 ("Emerging fourth generation services may well provide an alternative sufficient to lead a significant set of customers to elect a wireless rather than a wireline broadband service."); *id.* at 22 ("We urge the Commission to give priority to making more spectrum available so as to maximize their potential to compete against the established wireline ones.").

U.S. wireless providers now number over 140, not including another 43 non-facilities-based operators.[14] Over 95 percent of Americans are able to choose among three or more wireless providers, while nearly two-thirds of U.S. consumers have five or more facilities-based wireless providers to choose from.[15] When non-facilities based providers are factored in, the number of choices increase to double-digits in both large and small cities across the nation.[16] Meanwhile, new entrants continue to challenge and change the market dynamic, as illustrated by Clearwire's recent entry and the steady expansion of MetroPCS and Leap into new markets.

Competing wireless providers are investing in and expanding their broadband wireless offerings at an unprecedented pace. For example, in the face of one of the deepest recessions in recent history, T-Mobile spent over a billion dollars in 2009 in building out its 3G network, which now reaches 200 million people across the United States.[17] Indeed, T-Mobile already has deployed HSPA 7.2 across its entire 3G network and is moving aggressively to overlay HSPA+ 21 across the vast majority of its national 3G footprint by the end of 2010.[18] Clearwire recently raised $2.8 billion to build out its nationwide WiMAX network, which is already operating in 27

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14 Comments of CTIA – The Wireless Association, WT Docket No. 09-66, at 5 (filed Sept. 30, 2009) ("*CTIA Wireless Competition Comments*").

15 *Thirteenth CMRS Report*, 24 FCC Rcd at 6210 ¶ 41.

16 *CTIA Wireless Competition Comments* at 7-8.

17 *See* T-Mobile, Press Release, *T-Mobile USE Reports Third Quarter 2009 Results* (Nov. 5, 2009) (reporting almost $2 billion investment in the second and third quarters of 2009); *AT&T, T-Mobile Complete Network Upgrades,* Wireless Week (Jan. 6, 2010) ("T-Mobile says HSPA 7.2 is now enabled across T-Mobile's entire 3G network, which reaches more than 200 million U.S. residents. The operator plans to be the first in the country to launch HSPA+, which has peak data rates of 56 Mbps on the downlink and 22 Mbps on the uplink. T-Mobile says HSPA+ will be deployed 'across the bulk of its 3G footprint' this year.").

18 *See* Lynnette Luna, *T-Mobile aims for nationwide HSPA+ deployment by 2010*, Fierce Broadband Wireless, Sept. 19, 2009, http://www.fiercebroadbandwireless.com/story/t-mobile-aims-nationwide-hspa-deployment-2010/2009-09-19.

U.S. markets, covering 30 million people.[19] These are not isolated examples: In the past ten years, the "[e]conomic contributions of wireless services have grown significantly faster than the rest of the U.S. economy, averaging over 16% growth v. less than 3% growth for the remainder of the economy."[20] In 2008 alone, U.S. wireless carriers invested more than $20 billion in their networks, resulting in a total investment of more than $90 billion over the last four years—not counting the substantial investment wireless carriers have made in spectrum.[21] As a recent study performed for the Commission reports, the result of all this investment is that "[w]ireless broadband service providers expect to offer wireless access at advertised speeds ranging up to 12 mbps downstream . . . to about 94% of the population by 2013."[22] As both the Department of Justice and NTIA pointed out, in the face of consumer demand for increasing bandwidth-heavy uses, wireless providers will have ample competitive incentives to continue to invest heavily for the foreseeable future.[23]

In the face of such competition, it is extremely unlikely that any individual wireless broadband provider could succeed by standing as a powerful "gatekeeper" between a consumer

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[19] According to its website, "Clearwire . . . currently provides CLEAR 4G WiMAX service in Baltimore and Portland, and provides pre-WiMAX communications services in 50 markets across the U.S. and Europe. The company offers a robust suite of advanced high-speed Internet services to consumers and businesses. It is currently building a 4G WiMAX mobile internet wireless network, bringing together an unprecedented combination of speed and mobility." Clear, Coverage, https://www.clear.com/coverage.

[20] Michael T. Hoeker, Note, *From Carterfone to the iPhone: Consumer Choice in the Wireless Telecommunications Marketplace*, 17 CommLaw Conspectus 187, 215 (2008-2009).

[21] Comments of CTIA – The Wireless Association, GN Docket Nos. 09-51, 09-47, 09-137, at 14-15 (filed Aug. 31, 2009).

[22] Robert C. Atkinson & Ivy E. Schultz, *Broadband in America, Where It Is and Where It Is Going*, at 7 (Columbia Institute for Tele-Information, Nov. 11, 2009), http://www.broadband.gov/docs/Broadband_in_America.pdf ("*CITI Study*").

[23] *See DOJ Broadband NOI Ex Parte* at 9-10 ("[W]ireless broadband involves . . . substantial log-term marginal costs of expanding capacity in a given locale to serve more people or to accommodate increased usage.").

and the Internet (or between a consumer and application or content providers), rather than ensuring that consumers get the Internet access they want. In fact, the market is entirely capable of quickly disciplining wireless providers who fail to satisfy consumer demand. Contrary to the suggestion in the NPRM,[24] lock-in and switching costs do not inhibit competition in the wireless broadband market, where consumers are empowered to vote with their feet. One report notes that "[r]oughly 75 percent of the 17 to 20 million subscribers signing up with a new wireless carrier every year are coming from another wireless provider[.]"[25] And competitive pressure has compelled providers to offer consumers flexible options that further facilitate switching: T-Mobile has set the standard through its Even More and Even More Plus rate plans that offer attractive options and allow consumers to bring their own compatible phones to the network.[26] The reality is that customers have demanded more and more flexibility and freedom, and wireless carriers compete aggressively on this basis.

For additional evidence of customer mobility and competition, one need look no further than the amount wireless providers spend on advertising, which has continued to grow during

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[24] NPRM ¶ 69 n.160 ("Finally, even if the content, application, or service provider decided to refuse to deliver traffic in response to a proposed fee, users may decline to change broadband Internet access service providers due to switching costs or because they do not consider the particular content, application, or service to be essential.")

[25] Arthur Middleton Hughes, *Churn Reduction in the Telecom Industry*, http://www.dbmarketing.com/telecom/churnreduction.html; *see also* Rita Chang, *Wireless-Phone Companies Fight Rising Churn Rates* (Feb. 23, 2009), http://www.chetansharma.com/blog/2009/02/23/adage-article-wireless-phone-companies-fight-rising-churn-rates/.

[26] *See* T-Mobile, Even More and Even More Plus, http://www.t-mobile.com/Shop/Plans/Cell-Phone-Plans-Overview.aspx. T-Mobile USA offers a variety of no-term-contract options, including T- Mobile Prepaid phones and plans, FlexPay, and month-to-month services including its new Even More plans. Under the Even More Plus plan, customers may purchase any phone in T-Mobile's device lineup and sign up for a month-to-month rate plan. Customers have the option to purchase their phones up-front, or spread the cost out over time using an Equipment Installment Plan over time until the phone is paid off. And, of course, the "bring your own device" option gives customers even more flexibility.

hard economic times. In 2009, advertising spending in the wireless industry grew by 1.3 percent even while advertising spending for most other industries fell.[27] In the words of one analyst, "If the industry were not competitive[,] why would the industry spend more on marketing and advertising than any other industry in the U.S.?"[28] And in answering that question, the same analyst notes, wireless providers "market so much because customers can and do switch -- so U.S. wireless carriers bend over backwards to keep them with lower prices, more value, new devices, new features, new innovations[.]" [29] For the same reasons, providers are ever more focused on improving service quality and customer care.[30]

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[27] Congressional Research Service, *Advertising in the Digital Age* at 9, Table 2 (Nov. 2009), http://www.fas.org/sgp/crs/misc/R40908.pdf; *Nielsen: U.S. Ad Spend Falls 15.4% in First Half*, Adweek, Sept. 1, 2009, http://www.adweek.com/aw/content_display/news/agency/e3i0d1b247e2040d9db7d7ff3ccf67716e0.

[28] Scott Cleland, *Anti-competition Groups' Assertion Wireless Industry Not Competitive Ignores Facts & Common Sense* (June 6, 2009), http://precursorblog.com/content/anti-competition-groups-assertion-wireless-industry-not-competitive-ignores-facts-common-sense.

[29] *Id.* In fact, at a consumer rate of 5¢ per minute, wireless revenue per minute is 60 percent lower than the average of all other OECD countries. *See* Ex Parte Presentation of CTIA – The Wireless Association, RM-11361, GN Docket No. 09-51, WC Docket No. 07-52, at [page] (filed May 12, 2009), http://files.ctia.org/pdf/filings/US_Wireless_Industry_and_the_World_Ex_Parte.pdf. According to CTIA, the average local monthly wireless bill has fallen 49 percent in the last twenty years, while wireless minutes of use have grown 2,373 percent in the last ten years alone. CTIA, *The Wireless Perspective on a National Framework* (Sept. 2009), http://www.ctia.org/advocacy/position_papers/index.cfm/AID/11742.

[30] Such efforts have led to T-Mobile achieving the highest ranking in customer care in J.D. Power and Associates' 2009 Wireless Customer Care Performance Study. *See* T-Mobile, Company Information, Awards, http://www.t-mobile.com/Company/CompanyInfo.aspx?tp=Abt_Tab_Awards. More generally, according to a J.D. Power and Associates study issued August 27, 2009, "wireless carriers have reduced the number of connectivity issues, such as dropped calls, to 4 PP100 from 5 PP100 six months ago. Failed initial connections have declined to 3 PP100 from 4 PP100 during the same period. Wireless customers also report fewer audio problems, such as calls with static, which has decreased from 3 PP100 to just 2 PP100." *See* J.D. Power & Assoc., Press Release, *J.D. Power and Associates Reports: Overall, Wireless Carriers Reduce Dropped Calls, Failed Connections and Static, Driving an Improvement in Call Quality Performance*, Aug. 27, 2009, http://www.jdpower.com/corporate/news/releases/pressrelease.aspx?ID=2009155.

In sum, T-Mobile and other carriers have every incentive to be responsive to consumer demand, as every lost customer hits the bottom line in this vigorously competitive and investment-intensive industry. And—as discussed below—that means carriers have every reason to attract business from (rather than foreclose access by) complimentary application and content providers, as they have in fact done.

B. The Wireless Broadband Industry Is Vigorously Responding to Customer Demand for More Broadband Access and More Options.

As noted above, there have been warnings, for years, that wireless providers would block innovative new handsets, foreclose wireless VoIP access, preclude their customers from using WiFi, and otherwise closely control and limit wireless broadband access and innovation. But this has not happened. While there were some so-called "walled garden" approaches to providing applications and information services in the early stages of wireless data services—prior to the deployment of broadband capabilities—customer demand, competition among providers, and technological innovation (including, of course, the introduction of wireless broadband), has quickly driven carriers to deploy open platforms. Hence, without any government directive, the wireless broadband market has naturally evolved into an increasingly open ecosystem, with no end to this trend in sight. In response to consumer demand, providers have opened their systems and devices to VoIP, facilitated WiFi access, permitted handset unlocking, and allowed consumers on their networks to bring their own compatible devices and to broadly access applications and the Internet.

The most concrete example of the movement toward full openness in the wireless market is Android, the first open platform created specifically for mobile devices. Android, a joint product of the Open Handset Alliance, of which T-Mobile is a founding member, is an open source platform that enables third party developers to take advantage of the full capability of the

handset to create compelling mobile applications. With Android, third party applications can leverage all of the handset's core functionalities, such as making calls, sending text messages, or using the camera, and third-party applications developers have access to a wide range of useful libraries and tools to build rich applications.[31]

T-Mobile offers consumers several options for Android-based devices that operate on its network, including the G1, myTouch, Cliq, and Behold II, among others. Meanwhile, according to recent reports, the number of Android applications currently is estimated to exceed 20,000—the overwhelming majority of which are free to the consumer.[32] T-Mobile and other carriers also offer their own application stores or "channels" on Android-based phones. For example, T-Mobile's Android devices enable customers to access T-Mobile-branded applications and to purchase hundreds of applications from third party developers that have partnered with T-Mobile through the T-Mobile Partner Network.[33] T-Mobile offers a popular downloadable T-Mobile-branded application called Sherpa, which allows the customer to find virtually any business from architects to restaurants to zoos in the customer's immediate vicinity. Sherpa can access information culled from 12 million points of interest, parsed into categories and proximity using GPS, and personalized over time to provide recommendations that reflect the customer's interests and preferences. T-Mobile also offers its customers popular third party applications such as Pandora Radio and many others. Indeed, as Cole Brodman, chief technology and

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[31] *See generally* Open Handset Alliance, Android, http://www.openhandsetalliance.com/android_overview.html.

[32] Daniel Ionescu, *Android Market Hits 20,000 Apps Milestone*, PC World (Dec. 16, 2009), http://www.pcworld.com/article/184808/android_market_hits_20000_apps_milestone.html. That number doubled in less than five months. *Id.*; *see also Number of Android Apps? Over 9000!*, Livecrunch (Sept. 8, 2009), http://www.livecrunch.com/2009/09/08/number-of-android-apps-over-9000/.

[33] *See* T-Mobile Partner Network, http://developer.t-mobile.com/site/global/home/p_home.jsp.

innovation officer at T-Mobile, recently explained, the challenge the industry must overcome in the face of unbridled access to thousands of applications is how to inform consumers about the many, many options they have.[34]

Of course, consumers have all sorts of non-Android options as well. T-Mobile offers the Windows Mobile-powered Touchpro, the Blackberry Bold, and other smartphones that give customers a different experience over T-Mobile's 3G network while still broadly supporting compatible online applications and content. And finally, T-Mobile customers on any T-Mobile smartphone also can use their Internet connection to navigate the web more generally and access web-based applications. T-Mobile also offers its webConnect USB laptop sticks, which allow customers to surf the web just as if they were on a wired connection, with no restrictions other than (generous) plan-based bandwidth limitations.

Other providers have stepped up with other options, such as Apple and AT&T's iPhone, which is a smartphone platform controlled more closely by the manufacturer. Likewise, carriers have developed all types of unique, tailored offerings designed to satisfy consumer demand for different types of wireless Internet access, ranging from e-readers, to navigation devices with Internet-based traffic and weather news access, to child-focused or senior-citizen-focused devices, and the like. T-Mobile similarly is pursuing exciting machine-based applications that embed T-Mobile wireless chips in devices that need to interconnect wirelessly with the Internet, including smart grid meters, automotive devices, and others.[35]

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[34] Sebastian Rupley, *T-Mobile's CTO Talks Up Android — Going Forward, Apps Are Key*, GigaOM, Nov. 4, 2009 ("*T-Mobile's CTO Talks Up Android*"), http://gigaom.com/2009/11/04/t-mobiles-ceo-talks-up-android-going-forward-apps-are-key/.

[35] *See, e.g.*, T-Mobile, Press Release, *T-Mobile Announces First-of-its-Kind 'Embedded SIM' for Machine-to-Machine Solutions*, Apr. 23, 2009, http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20090423&title=T-

"Openness" has become a key theme in how carriers differentiate themselves to attract customers in today's marketplace. T-Mobile, for example, specifically touts the many applications available over its Android phones in national advertising materials and campaigns; its materials also trumpet the number of apps available and highlight recommended or high-quality apps that add value for customers.[36] AT&T similarly competes on the basis that it offers "Apps for Everything" and a "fast . . . advanced web browser" with full search capabilities.[37] Providers recognize that what sells is *more, better, and faster* access to the Internet and as much compelling content and applications as possible. Clearly, the broad reach and openness of the platform has become a competitive differentiator in the industry—not something that is at risk without regulatory intervention.

In sum, the essential competitive characteristics of the wireless broadband marketplace promote and nurture openness. Neither the current performance of the marketplace, nor the direction in which it is heading, provides any basis for regulatory intervention. To the contrary, regulation is unnecessary because the industry has already embraced the precise vision of the wireless Internet ecosystem that the FCC envisions: a platform that creates endless opportunities for innovation by network and edge providers and that provides robust access for consumers to a dynamic, expanding, and exciting range of content, applications, and services.

Mobile%20Announces%20First-of-its-Kind%20'Embedded%20SIM'%20for%20Machine-to-Machine%20Solutions.

[36] *See* Appendix A (showcasing recent T-Mobile materials promoting applications and Internet access).

[37] *See* Apple, iPhone, http://www.apple.com/iphone.

II. IMPOSING NET NEUTRALITY RULES ON WIRELESS BROADBAND WOULD BE INCOMPATIBLE WITH THE UNIQUE TECHNOLOGY AND NETWORK MANAGEMENT NEEDS OF WIRELESS BROADBAND PROVIDERS.

The Commission observes, correctly, that there are "technological . . . differences" between wireless and wireline Internet access services.[38] Wireless carriers face spectrum constraints, expanding yet highly unpredictable demand, interference hurdles, handset and device coordination requirements, and ongoing and fast-paced technological evolution. To manage these challenges day-to-day and drive wireless broadband to the next level, wireless broadband providers need a full toolkit of network management techniques that enable them to respond quickly and dynamically as issues arise—allowing consistent delivery of high-quality voice services and next-generation applications in a bandwidth-constrained environment. As applications become more complex and bandwidth intensive, wireless providers will be increasingly dependent upon network management and product differentiation strategies to remain and grow as a competitive force in the bandwidth-driven broadband ecosystem. And while additional spectrum will help carriers meet some of these challenges, even as such spectrum becomes available, ongoing, pro-active network management will remain a critical requirement of wireless networks.

The Commission proposes to address this by interpreting the "reasonable network management" exception liberally in the context of wireless broadband[39] and by creating a new exception for "managed" or "specialized" services.[40] Unfortunately, these exceptions are not well defined in the NPRM and are in any event post-hoc defenses. They do not change the fact

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38 NPRM ¶ 154.

39 *Id.* ¶¶ 172-73.

40 *Id.* ¶ 156 (suggesting that certain data services are not broadband Internet access services).

that the rules themselves threaten the fundamental need for constant and active oversight to deal with unpredictable network management challenges in the wireless ecosystem. The nondiscrimination rule, in particular, is at odds with the type of scheduling and prioritization that are a core part of the basic operation of a wireless network, not an occasional exercise for specialized applications. Similarly, the no-blocking rule jeopardizes a network environment where wireless providers constantly confront new technologies and a range of devices and applications that can affect the network in unanticipated ways. Because these issues arise constantly, providers would inevitably be required to invest critically valuable time and resources in responding to FCC complaints, investigations, and litigation, with collateral, negative impact on investment, innovation, and creative, active network management. This would not serve "the goals of innovation, investment, research and development, competition, and consumer choice" that are the fundamental aspirations of this proceeding, and which T-Mobile supports in the marketplace.[41]

A. The Limitations of the Radio Spectrum Require Wireless Providers To Actively Manage Networks to Maintain Service Quality.

At a certain point, spectrum availability sets a concrete, upper limit on the last-mile capacity of the network, and it is universally acknowledged that there is not enough spectrum to support growing wireless broadband demand. Just this month, the Department of Justice warned that "the scarcity of spectrum is a fundamental obstacle that the Commission should address."[42]

Spectral efficiency has been increasing, to be sure, and will improve further as carriers complete their migrations to 3G and then to 4G. Like other carriers, T-Mobile has built thousand

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41 *Id.* ¶ 154; *see also NTIA Broadband NOI Ex Parte* at 1 ("The Commission's fundamental challenge is to promote the unregulated, market-driven innovation that has been the hallmark of the Internet economy, while also encouraging continued investment in and deployment of the open communications networks on which that economy rests.").

42 *DOJ Broadband NOI Ex Parte* at 21-22.

of sites to provide infill capacity, pursued innovative antenna systems, introduced low-rate codecs to make voice more efficient, and employed numerous other tools to maximize spectral efficiency.[43] But such gains cannot keep up with the increasing pace of wireless broadband adoption and use. As the Commission itself recognized, "even as the telecommunications industry works to improve spectral efficiency, usage of spectrum is growing at such a rate that without additional large blocks of spectrum the industry will not be able to keep up."[44]

The impending spectrum crisis grows more real each day as the demand for wireless broadband access balloons in this country and around the globe. In 2007, for example, the number of wireless subscribers grew almost 9 percent, to 86 percent of the U.S. population.[45] The number of subscribers grew again in 2008, both in absolute numbers and as a percentage of the population,[46] and is estimated to have done so again in 2009, global recession notwithstanding.[47] Early analysis suggests that by the end of 2009, 92 percent of the U.S.

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43 Castle Decl. ¶ 5.

44 Public Notice, *Comment Sought on Spectrum for Broadband, NBP Public Notice No. 6*, DA 09-2100, GN Docket Nos. 09-47, 09-51, 09-137, DA 09-2100, at 4 (rel. Sep. 23, 2009). Indeed, as an aide to the Chairman recently said, "Spectrum is the oxygen of the wireless world. Demand for more capacity is exploding and increased spectral efficiency can only do so much." Howard Buskirk, *Google Voice Probe Shows Changes Overtaking Wireless Industry, Federal CTO Says*, Commc'ns Daily (Sept. 16, 2009).

45 *Thirteenth CMRS Report* , 24 FCC Rcd at 6190-91 ¶ 2.

46 *CTIA Wireless Competition Comments* at 58 (number of subscribers now exceeds 270 million, representing nearly 88% of the US population).

47 Between June of 2008 and June of 2009, wireless subscribership is estimated to have grown 5.3% to over 276 million. *See* Reply Comments of CTIA – The Wireless Association, GN Docket Nos. 09-157, 09-51, at 6 (filed Nov. 5, 2009) (citing *CTIA's Wireless Industry Indices: Semi Annual Data Survey Results: A Comprehensive Report from CTIA Analyzing the U.S. Wireless Industry, Mid-Year 2009 Results* at 2).

population was subscribed to a wireless service.[48] Today, over half of all Americans have accessed the Internet wirelessly, and almost 20 percent use a handheld device to access the Internet daily.[49] Eighty percent of T-Mobile's myTouch users browse the web at least once per day, and two-thirds do so several times per day.[50] Industry analysts predict that wireless traffic will increase by a factor of 66 by 2013,[51] and a recent report suggests that wireless data traffic will *double* every six months for the next two years.[52] If usage trends continue, as expected, current 3G networks worldwide could be overwhelmed by congestion within a year or two.[53]

The issue is not just that more wireless users are online. To compound matters, the type of wireless broadband usage has changed over time, as well. As speeds and handsets improve, wireless consumers use their devices for longer periods of time and for more bandwidth-heavy applications. For example, as we have reported, G1 handset users consume over 300 megabytes per month[54]—more than 50 times the data of the average T-Mobile customer.[55] More than 40

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48 *See* J. Gerry Purdy, PhD, Frost & Sullivan, *2010 Outlook & Forecast: Mobile & Wireless Communications*, at slide 4 (Dec. 1, 2009), http://www.slideshare.net/FrostandSullivan/2010-outlook-forecast-mobile-wireless-communications.

49 John Horrigan, Pew Internet and American Life Project, *Wireless Internet Use*, at 3-4 (July 2009), http://www.pewinternet.org/~/media//Files/Reports/2009/Wireless-Internet-Use.pdf.

50 *T-Mobile's CTO Talks Up Android*, *supra* n.34.

51 Amy Tierney, *Cisco: Video Fuels IP Traffic Growth*, TMCnet, June 9, 2009, http://ip-pbx.tmcnet.com/topics/ip-pbx/articles/57656-cisco-video-fuels-ip-traffic-growth.htm.

52 Oppenheimer, *2010 Outlook: The Year of Wireless Data and Restructuring*, Equity Research Industry Update, at 6 (Jan. 12, 2010).

53 *See* Claudine Beaumont, *Mobile phone networks face 'crisis' as data traffic surges*, Telegraph.co.uk, Dec. 7, 2009, http://www.telegraph.co.uk/technology/mobile-phones/6726623/Mobile-phone-networks-face-crisis-as-data-traffic-surges.html.

54 National Broadband Plan Workshop: Wireless Broadband Deployment Tr., GN Docket 09-51, at 12 (Aug. 12, 2009) (Comments of Neville Ray, T-Mobile USA, Inc.), http://www.broadband.gov/docs/ws_03_deploy_wireless_transcript.pdf.

percent of T-Mobile myTouch users access social-networking sites multiple times per day.[56] Over thirty percent of T-Mobile data traffic already consists of video streaming—a majority of which is attributable to Android users.[57]

As Chairman Genachowski has observed, one thing is clear: When "we quadruple the number of subscribers with mobile broadband on their laptops or netbooks" and "every mobile user has a [smartphone]," "we will need a lot more spectrum."[58] That is particularly true to the extent the Commission intends to enable wireless broadband to make a substantial contribution as an alternative in the broadband market—an objective this Administration has identified as a key broadband priority.[59] As DOJ and NTIA have clearly articulated, achieving the objective of wireless broadband as a true alternative to wireline broadband requires that the Commission address the looming spectrum crisis, and do so quickly. In the DOJ's words, "there is no time to spare, given the exploding demand for broadband mobile use, the long lags historically experienced in allocating spectrum to new uses, and the danger that 'the spectrum pipeline is drying up.'"[60] For this reason, CTIA, T-Mobile, and others have recommended that the

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55 *See T-Mobile: G1 Users Use Data in Record Numbers*, Wireless Week (Apr. 1, 2009), http://www.wirelessweek.com/News-CTIA-2009-T-Mobile-G1-Users-Data-Record-040109.aspx.

56 *T-Mobile's CTO Talks Up Android*, *supra* n. 34.

57 Castle Decl. ¶ 6.

58 Prepared Remarks of Chairman Julius Genachowski, America's Mobile Broadband Future, International CTIA Wireless I.T. & Entmt., San Diego, Ca., at 5 (del. Oct. 7, 2009), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-293891A1.pdf.

59 *See NTIA Broadband NOI Ex Parte* at 8 ("The Commission should work to expand competition in local broadband Internet access services, in order to reduce prices, improve quality, and spur innovation."); *id.* at 4 ("Given the projections of explosive growth in wireless bandwidth requirements, a primary tool for promoting broadband competition should be to make more spectrum available for broadband wireless services.").

60 *DOJ Broadband NOI Ex Parte* at 22 (quoting FCC National Broadband Plan, September Commission Meeting (Sept. 29, 2009)). *See also NTIA Broadband NOI Ex Parte* at 5 ("The

Commission allocate and auction an additional 800 MHz of spectrum for commercial mobile broadband use.[61]

But it is important for the Commission to recognize that while new spectrum is a fundamental necessity, it is not a sufficient answer. Providers will continue to need to engage in day-to-day network management, because the "virtuous cycle" of development will continue to ensure that available spectrum is quickly filled with new applications and bandwidth-intensive content. To address this reality, carriers will need to engage in a variety of creative management techniques. One of these may be usage-based pricing, which would allow providers to accommodate the minority of high-volume customers—who place the heaviest burden on the network—efficiently and without harming or imposing unfair costs on lower-bandwidth users. AT&T recently announced that it may consider this option to address the fact that 3 percent of smartphones are responsible for 40 percent of its data traffic,[62] Verizon Wireless has announced that it plans to introduce a usage-based pricing model concurrent with its LTE rollout this year,[63] and T-Mobile may at some point choose to pursue this approach as well.

Administration supports exploring both commercial and government spectrum available for reallocation, and favors a spectrum inventory to determine how radio frequencies are currently being used and by whom.").

[61] *See Ex Parte* Letter from Christopher Guttman-McCabe, VP, Regulatory Affairs, CTIA – The Wireless Association, to Chairman Julius Genachowski, and Commissioners Copps, McDowell, Clyburn, and Baker, FCC, GN Docket No. 09-51, at 1-3 (Sept. 29, 2009); Comments of T-Mobile USA, Inc. in WT Docket No. 09-66, GN Docket Nos. 09-157, 09-51 (filed Sept. 30, 2009) ("*T-Mobile Wireless Innovation and Competition Comments*").

[62] *See* Andrew LaVallee, *AT&T to New York and San Francisco: We're Working on It*, Wall Street Journal Digits Blog, Dec. 9, 2009, http://blogs.wsj.com/digits/2009/12/09/att-to-new-york-and-san-francisco-were-working-on-it/ (reporting AT&T Mobility CEO's statement that about 3 percent of smartphone users were responsible for 40 percent of 3G data traffic).

[63] Phil Goldstein, *Verizon envisions usage-based model for LTE*, Fierce Wireless, Jan. 8, 2009, http://www.fiercewireless.com/story/verizon-envisions-usage-based-model-lte/2010-01-08.

And wireless providers will need the freedom to continue to engage in various network-based forms of management to ensure quality of service—regardless of the consumer's service tier. As discussed below, even apart from spectrum limits, providers face unique challenges in the wireless environment that must be carefully navigated in order to provide customers with a robust experience. Thus, achieving next generation wireless broadband as a real and vital alternative broadband will require both more spectrum and continued freedom to engage in robust network management.

B. Variability, Mobility, and Changes in Technology Require Flexibility in Wireless Network Management.

Aside from the bandwidth constraints imposed by the use of spectrum, wireless broadband networks have unique technological characteristics that pose enormous engineering challenges. The Commission acknowledges this,[64] but seems to take it on faith that there are reasonable ways to apply net neutrality rules regardless. T-Mobile urges the Commission to reassess that assumption.

The shared nature of wireless broadband networks creates very significant network management challenges, because one user or application can cause havoc for large numbers of other users and applications. Indeed, it took only one rogue application on T-Mobile's network to temporarily overload facilities serving an entire city. That problem arose when an independent application developer released an Android-based instant messaging application that did not create problems during the testing done by the developer in the WiFi-to-wireline broadband environment, but that, because of its design, exponentially increased signaling in the wireless environment—especially as it became popular and more customers began downloading it to their smartphones. As a result, the application caused severe overload problems in certain

[64] NPRM ¶ 156.

densely populated network nodes. One study showed that network utilization of one device increased by 1,200% from this one application alone. These signaling problems caused network overload problems that affected all T-Mobile 3G users in the area.[65]

This type of problem could happen again, especially over the open Android platform, where applications are not vetted for security or network impact prior to release.[66] Given the openness of the platform to any third party application, security and performance issues are typically not discovered until after the fact, when damage to the network may already be underway or at least imminent, and when an immediate response is most critical.

Another unique problem in the wireless environment is that wireless broadband is shared between voice and other applications, including bandwidth heavy applications like gaming, streaming video, or always-on social networking. Thus, without careful network management, one customer's online video game frenzy could interfere with and even block another customer's critical life-saving telephone call.[67]

The sharing challenge is more acute in the wireless context because wireless providers have no way to anticipate how many users will be sharing the wireless network in a particular cell sector at any particular time. In the words of one industry observer, "users are always moving from one location to another, tapping into the network constantly, sometimes for a few

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65 Castle Decl. ¶ 7.

66 In the words of Rich Miner, manager of Google's mobile platforms group, "Our vision is there's not gatekeepers . . . . There's no human looking at the apps to see what they're doing." Stephen Shankland, *Coders get 70 percent of Android Market revenue*, CNET News, Oct. 22, 2008, http://news.cnet.com/8301-1035_3-10072682-94.html.

67 *See* Castle Decl. ¶ 8.

seconds, other times for hours on end."[68] Accordingly, wireless providers face unique challenges in predicting how much capacity should be available or will be required at a particular location because the number of users at that location can change minute by minute. As many customers have experienced when shopping at a crowded mall or attending a popular sporting event, use of the network by other customers in a given location can dramatically impact the speed and availability of the network.

Wireless networks also are affected by the types of devices on the network and how they operate because as devices communicate with the network, they consume network resources in ways that can be more or less efficient and that can affect other users more or less radically. In order to ensure that there are sufficient network resources for all users, carriers try to work closely with their handset partners to ensure that devices are optimized to provide service over the network using the least possible network bandwidth.[69] For example, a carrier and device manufacturers might work to limit unnecessary communication from the handset to the network nodes when the handset is not in active use. But carriers must also support older devices that are not optimized for the network today. And in a "bring your own device" world where carriers have no control over the devices on their network, carriers must contend with unpredictable bandwidth drains from devices that are not optimized for the particular network. Such devices

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[68] Jon Fortt, *Bandwidth Hogs – iPhone and other smartphones*, CNNMoney.com, Aug. 28, 2009, http://brainstormtech.blogs.fortune.cnn.com/2009/08/28/bandwidth-hogs-iphone-and-other-smartphones.

[69] Indeed, at the FCC's Technical Advisory Workshop on December 8, 2009, several experts explained the "strong interdependence" of the network with handsets and other devices and the challenges this creates for network management purposes. *See* Technical Advisory Workshop Transcript at 240 (Dec. 8, 2009), http://www.openinternet.gov/workshops/docs/ws_tech_advisory_process/Technical%20Advisory%20Workshop%20Transcript.doc (quoting Tom Sawanobori, Vice President of Network and Technology Strategy, Verizon).

may also be more likely to create service disruptions for other users and devices on the network.[70]

Meanwhile, wireless carriers are grappling with unknowns in their own constantly evolving technological platforms. T-Mobile has moved quickly to deploy HSPA 7.2 on its 3G network—which will give T-Mobile customers speeds up to 3.6 Mbps faster than the 3G networks of other carriers.[71] This new deployment means new usage patterns, new possibilities for congestion, and new potential vulnerabilities and security risks. As noted above, technological advances and bandwidth and speed improvements have resulted in more and different usage of the network. Thus, wireless providers do not even yet know what challenges they may confront. This is perfectly illustrated by the fact that when T-Mobile confronted the excessive signaling issue created by the instant messaging application discussed above, its UMTS radio vendors were forced to reevaluate the architecture of their Radio Network Controllers because no one had anticipated this development or challenge.[72]

C. The No-Blocking, Any Device, and Nondiscrimination Rules Could Threaten Existing and Emerging Measures To Address Network Challenges.

T-Mobile is concerned that the Commission's proposed rules could be understood to call into question the management tools that carriers rely on today to address network management challenges and would deter the development of creative, forward-looking solutions in the future. Given the dynamic nature of the network, the following examples are necessarily incomplete. They nevertheless illustrate the range of unintended and problematic consequences that could be triggered by the proposed rules.

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70 *See* Castle Decl. ¶ 11.

71 Sascha Segan, *T-Mobile Improves 3G Options*, PC Mag, Nov. 11, 2009, http://www.pcmag.com/article2/0,2817,2355732,00.asp.

72 *See* Castle Decl. ¶ 7.

1. Prioritization of Voice

Today, 3G network providers preserve voice quality by ensuring that when there is any clash between voice and other network uses, the network will prefer the voice transmissions and allow a voice call to be transmitted first.[73] The NPRM makes clear that the proposed rules would not apply to traditional voice service and thus should not prohibit this type of prioritization.[74] It is less clear, however, whether this same rule holds true with respect to prioritization of voice when it transitions to an all IP-format in LTE-based 4G networks. Would the carve-out for voice continue to permit providers to prefer voice traffic? If the Commission does not clarify that carriers may engage in packet differentiation and quality of service measures to accomplish this, the future of voice over 4G networks could be very much in question.

2. Network Management Algorithms to Balance Traffic Loads and Support Competing Applications

T-Mobile is also concerned that the Commission's nondiscrimination rule could be read to undermine other even more important network management techniques. T-Mobile is evaluating techniques in UMTS networks that allow for the reprioritization of traffic based on application type with the goal of providing the best user experience for all users. For example, if there are users in a cell that are engaged in a "real-time" service (*e.g.*, watching a streaming video), as well as users with devices that are engaged in applications that are less latency-sensitive (*e.g.*, downloading email), it is advantageous from the perspective of the network and users overall to depriortize (or minimally delay, by milliseconds or seconds) the email traffic in order to allow the "live" traffic to go through to the actively-engaged users. Various sorts of management techniques exist or are being developed that could accomplish this. These include

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73 *See id.* ¶ 15.

74 NPRM ¶ 156.

"scheduling" algorithms, "channel selection" (*i.e.*, assigning lower power/lower throughput channels to certain applications), and even dividing applications up by frequency.

Applying such techniques would allow the network to allocate resources to best address all the competing needs of users, applications, and devices that are engaging its resources at any given moment. For example, applying these techniques might mean that the email user might end up receiving the email a few seconds later, but this incremental delay might not even be perceptible—especially in connection with "passive" email downloading which devices like Blackberry will do proactively even when the user is not actively engaged in using the device. This delay would in any event be far less disruptive and quality-affecting than a delay in the real-time viewing of a video stream (or a VoIP call). Network performance for users on the whole would be much improved, and—ideally—the result would be that each user enjoyed a quality of service that was appropriate and sufficient to support the device and service or application that the user was employing at that moment in time.

These management techniques either exist today or are in the development or deployment stage, and they will be a core component of network management as more and more bandwidth-intensive and performance-sensitive applications are brought onto the shared network. They will need to be employed on a near-constant basis to manage the network load and fairly serve the different needs of different users, devices, and applications. Without the flexibility to employ such measures, all users and all applications would suffer. Yet such algorithms might be at odds with the NPRM's proposed no-prioritization rule because they would necessarily involve prioritizing or deprioritizing (or even blocking) a particular application or packet at a particular moment in time.[75]

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[75] *See* Castle Decl. ¶ 17.

While the NPRM could be read to suggest that this type of management will always be defensible as "reasonable" to protect network performance, different providers may employ scheduling based on different determinations; in addition, the precise balance will be different at any given moment in time even within an individual provider's network. Who is to say what is "reasonable?" That is especially so given that these techniques are so new. Furthermore, over time, scheduling may be enhanced with forward-looking technological developments to allow more and more enhanced and more dynamic quality of service assurances that could be valuable for certain applications and services offered by content and application providers. The NPRM suggests that providers might be precluded from offering those capabilities for a fee, which could stand as an impediment to developing those capabilities at all, or could make it impossible for the applications and content that need that prioritization to develop or succeed.[76]

3. Video Compression

The Commission should also not adopt any rule that would preclude wireless providers' compression of website or video content. This compression can increase transmission speeds and improve the client-server interactions between the customer and the website. Beyond that, it also may improve the customer's experience. For example, compressing HTML images so they are "resized" for viewing over the small phone on a handheld device can enhance the customer's broadband service experience.[77] The Commission's rules might preclude such measures as "discriminatory," in which case, to the extent they are designed to improve the customer's experience rather than simply protect the network, even a truly expansive "reasonable network management" justification would be of little help.

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76 *See id.* ¶ 19.

77 *See id.* ¶ 16.

Even more worrisome, some might argue that the proposed nondiscrimination rule's ban on commercial arrangements should bar T-Mobile from working directly with content or application providers to develop such optimization techniques. Currently, several popular content sites such as YouTube, MTV, NBC and others, have the ability to compress the video or resize the images they send to handheld mobile devices. Some might very well argue that the proposed rules preclude a content provider from working with T-Mobile to provide that functionality. That would force the content provider either to implement the capability itself or outsource it to a third party. Not only would this result disserve wireless consumers, who more often than not expect small device optimization; but it would also disfavor small content providers that lack the means to create and implement optimization techniques for each of platforms they serve.

4. Prioritization Techniques Designed to Allow the Network to Support Bandwidth-Intensive Applications

T-Mobile is also concerned that an aggressive reading of the rules could preclude wireless companies from working with interested content providers to develop the capability to stream high-quality video over 3G or 4G networks. Currently, the performance sensitivity of streaming video makes it very difficult to offer high-quality video service over wireless devices, particularly to a mobile user moving from cell tower to cell tower. And, because video is bandwidth-hungry, streaming video applications (especially high-quality ones) could interfere with other sensitive applications such as voice.[78] Engineers have devised various techniques that might help address this problem, including prioritization techniques and distributed video-server

[78] *See id.* ¶ 20.

nodes throughout the wireless network.[79] One or more content providers might be willing to partner with T-Mobile (or with several wireless providers) to invest in such a solution, or a university might be willing to partner in such an effort to offer high-quality e-learning capabilities. Yet depending on how it is applied and how the "managed services" conundrum is resolved, the proposed "nondiscrimination" rule could bar such arrangements, even if offered to other video providers (or universities) on equivalent commercial terms.

Again—agreements with video providers to enhance (or compress) their content might very well qualify as permissible "managed services"—as would similar arrangements with universities or other entities with new applications requiring special support. And it is quite possible that the Commission does not understand the NPRM's proposals to preclude providers from developing and offering various prioritization techniques to support such managed services on commercially reasonable terms. But the lack of clarity in the NPRM will be a significant disincentive for parties considering a costly new venture that may or may not ultimately be deemed a managed service—which may or may not be exempt from any net neutrality rules.

5. Blocking or Limiting Harmful Applications

Presumably, everyone would agree—in hindsight—that it would have been appropriate for T-Mobile to block the WiFi-optimized Android instant messaging application discussed above, as it directly threatened scarce network resources, and affirmatively harmed users. In a changing network environment, it is not always appropriate or responsible to wait until an

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[79] *See, e.g.,* Yongin Cho *et al.*, *Video Streaming over 3G Networks with GOP-Bases Priority Scheduling* (2006), http://www.computer.org/portal/web/csdl/doi/10.1109/IIH-MSP.2006.168; Anna Kyriakidou *et al.*, International Workshop on Data Engineering for Wireless and Mobile Access Archive, Proceedings of the 4th ACM international workshop on Data engineering for Wireless and Mobile access (2005), http://portal.acm.org/citation.cfm?id=1065882; Ivan Lee & Ling Guan, *Wireless Video Streaming Over Integrated 3G and WLAN Networks,* International Journal of Wireless and Mobile Computing (2007), http://portal.acm.org/citation.cfm?id=1358442.

application has degraded the network to act. A provider might reasonably decide, for example, that applications from a certain source have been problematic in the past, and should be blocked at least until the developer has certified (or T-Mobile has verified) that the applications meet network standards. Certain applications may appear suspicious because they are similar to others that have carried viruses or worms or even worse cybersecurity threats in the past—thus requiring cautious preventative action. Providers need the flexibility to limit suspicious applications until they are tested; providers must also be able to limit use of potentially disruptive applications until a means is devised to support new features on the network without causing collateral damage to other applications and services.

But how can a provider faced with a previously unknown but potentially harmful application be assured that its response will be deemed reasonable in hindsight? This is one of the chief problems with the Commission's proposed "reasonable network management" exception. It introduces the possibility that providers may be penalized for good faith efforts to protect the security and quality of the network from new threats.

D. The "Reasonable Network Management" and "Managed Services" Exceptions Do Not Save the Proposed Rules.

The NPRM acknowledges the challenges facing wireless providers, but assumes that they can be addressed through the exception for reasonable network management, applied liberally in the wireless environment.[80] As shown by examples above, this approach is not workable. The NPRM's "act now, penalize me later" regulatory framework will infuse every network management decision with risk that would distort the process of making those crucial decisions to the detriment of both providers and consumers. The Commission has acknowledged (and T-Mobile agrees) that the standard in the *Comcast Order* was too strict (*i.e.*, that network

[80] NPRM ¶ 172.

management "should further a critically important interest and be narrowly or carefully tailored to serve that interest").[81] Any approach that puts the onus on the carrier to defend the reasonableness of its network management practices after the fact is likely to have a seriously detrimental effect. Every time a provider confronts a new situation, it will have to weigh the need for prompt action against the exposure to regulatory or judicial sanction. The need to consult with counsel will consume time and resources, and inevitably lead to more conservative network management decisions and less investment in creative new network management technology and techniques. Often, carriers will not have the luxury of time, as events unfold on the Internet at breakneck speed. The pressure to defend the reasonableness of every action could damage wireless network quality over the long term, increase cybersecurity risks, and hobble wireless broadband networks in their efforts to offer a competitive alternative to wireline service in the broadband ecosystem.[82]

Finally, the possibility that some of these network management techniques may prove to be exempt "managed services" is also unavailing. The NPRM does not contain guidance needed to differentiate between services that manage the network and "managed services" on the network. For example, as discussed above, the NPRM suggests that a carrier's own IP voice service might be a "managed service," but it is less clear then it should be that providing the same "specialized service" to over-the-top-VoIP application providers would be considered a managed service. If it is not, the proposed rules would create artificial distinctions with negative regulatory consequences. But if both are considered managed services, it is unclear why some prioritization arrangements would qualify and why others would not.

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81 *See Id.* ¶ 137; Mem. & Order, *Formal Complaint of Free Press and Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications*, 23 FCC Rcd 13028, 13055-56 ¶ 47, pet'n for review filed, *Comcast v. FCC*, No. 08-1291 (2008).

82 *See* Castle Decl. ¶ 20.

A better approach would be to exempt all such services from Commission regulation and prohibit none of them—whatever they are called. Indeed, commercial arrangements that tailor the manner in which traffic is handled to a content or application provider's unique needs or its value proposition make perfect economic sense and would enhance the value of the network for providers and users alike. The fear that permitting such arrangements would somehow degrade other, nonprioritized traffic has no basis: providers are investing in spectrum and next generation traffic and touting the openness of their platforms because they *want* to offer attractive Internet access service to as many customers as possible. They cannot accomplish that by degrading traffic from sites and content and application providers that customers expect to access, nor by otherwise interfering with the open Internet experience that customers value.

The way to protect reasonable network management and managed or specialized services is not by first prohibiting them generally and then layering on possible exceptions designed to reconcile the rule with the realities. The wireless broadband marketplace has been healthy and has supported and encouraged "edge" development by thousands of applications developers, manufacturers, and content providers, while employing all sorts of techniques to manage the network and balance consumer and traffic needs. The Commission should allow it to continue to do so without the chilling impact and unintended consequences of regulatory intervention.

III. THE PROPOSED RULES COULD BE UNDERSTOOD TO PRECLUDE MANY BUSINESS ARRANGEMENTS THAT ADVANCE CONSUMER WELFARE.

In the wireless broadband ecosystem, providers are involved in offering consumers many different components of the broadband access "experience." Thus, for example, as explained above, wireless providers partner with handset manufacturers to offer devices that are closely integrated with the network to optimize both network and handset performance.[83] This operates

[83] *See* Grant Decl. ¶ 11.

to consumers' advantage: Close collaboration between the network and the manufacturer ensures that consumers enjoy the maximal capabilities of the network on a device optimized specifically for the network, and also helps reduce interference and maximize network resources for all users. Consumers are of course free to bring their own devices to the network (as they would in the wireline context) but the result may be poorer battery life and less optimal performance of the device, and—without careful network management—more interference and congestion on the network for all users. While carriers like T-Mobile do support consumer demand for "bring your own device" offerings, the NPRM's proposed "any device rule" would undeniably have far different implications in the wireless world than in the wireline setting.

Wireless providers may also partner with non-traditional device makers such as smart-grid meter vendors and automobile manufacturers. For example, T-Mobile is working with various companies to include transmitters in their products that will enable them to communicate with consumers and internally via T-Mobile's wireless network.[84] Surely, the Commission's any device rule is not meant to suggest that T-Mobile must permit any company to insist that T-Mobile place network transmitters in any device selected by the company. Presumably the Commission also did not intend to prohibit such arrangements as being "discriminatory," even though the inclusion of a T-Mobile transmitter in a particular device may help transmit that manufacturer's "application" to customers, and not the applications of other similarly situated entities (*e.g.*, a competing smart grid company). Yet the NPRM's proposed rules do not make this clear, and the ambiguity would ultimately prove chilling.

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[84] *See, e.g.*, Echelon, Press Release, *Echelon and T-Mobile Announce Alliance to Reduce the Cost of a Secure Smart Grid Network for Utilities*, Apr. 22, 2009, http://www.echelon.com/company/press/2009/tmobilealliance.htm.

Nor do the proposed rules adequately account for the fact that wireless providers often work directly with application developers to support the creation of carrier-specific applications. Given the variety of wireless technologies and platforms, wireless providers must offer direct support to developers to ensure they can produce successful applications. As part of their cooperation with application providers, carriers regularly enter into arrangements to feature certain applications on their devices or within the provider's app store or "channel." Thus, for example, T-Mobile offers its own application channel over which it offers its own branded applications alongside those of third party applications developed through the T-Mobile Partners Network.

T-Mobile is concerned that the proposed rules could be used by some to argue that such arrangements unlawfully "discriminate" in favor of the featured applications or content—especially because many of these arrangements include the sharing of revenues and other "commercial arrangements." For example, the NPRM raises a question about the relevance of the distinction between applications that are native to a handset and those that may be accessed only over the handset's web browser.[85] But if this distinction were deemed to be problematic, it could potentially imperil all of T-Mobile's and other providers' "on-deck" applications.

It is not at all clear how eliminating arrangements like these, which are an outgrowth of the industry's cooperative, multi-layered model, promotes the Commission's stated goals. While some advocates insist that it would be better to deconstruct the wireless marketplace so that

[85] NPRM ¶ 174 ("Does the quality of a user's experience with an application vary depending on whether the application is downloaded onto the user's device or whether it is accessed in the cloud using the device's Web browser?"). The Commission's question fails to account for the fact that some customers may in some cases prefer web-based applications because they provide an alternative that can be used without respect to the handset's operating system. There are tradeoffs, to be sure, but the Commission should not make that choice for consumers.

carriers have no involvement in anything other than access, consumers—*who have the choice*—do not universally opt for that approach. Many more T-Mobile customers choose to purchase T-Mobile partnered devices than bring their own devices to T-Mobile, even though that option is offered. And, some customers using Android phones find the thousands of Android applications overwhelming and prefer the more managed experience of the T-Mobile application channel, which features select applications in an organized format. Some consumers do not want to make separate arrangements with a plethora of companies regarding every single detail of their service such as which search engine they will use as a default, which voice mail service to use, where their data will be stored, or how their pictures will be displayed. They may want the option to use a particular application for one or more of these functions, but they might prefer to build off an integrated product offering from a service provider that has worked with manufacturing and application partners to develop an optimized package. It cannot serve the public interest to *eliminate* that option—especially since the bring-your-own-device model exists, and customers who *want* to assemble their own platform from scratch can do so.

The possibilities for tailored, innovative, pro-consumer wireless offerings are virtually endless and still largely unexplored. Consumers would clearly lose out—but so would the industry at large, including the application and content providers whose interests the NPRM purports to advance—if the Commission's proposed nondiscrimination and no-blocking rules are interpreted broadly to preclude such offerings. As one economist recently wrote, "niche and value-added service markets [such as] mobile healthcare, mobile e-Commerce, and location-

aware services . . . are pro-competitive since they expand revenue opportunities for incumbents and entrants alike, and should contribute to promoting adoption and usage rates."[86]

Neither the "reasonable network management" nor the "managed services" exceptions are (or could be) clear enough to alleviate the chilling effect the NPRM could have on the pro-competitive relationships, devices and services discussed here or those that might otherwise arise in the future. First, many of these collaborations have little to do with network management. Instead, they are designed to provide products or services to consumers that might otherwise be cost prohibitive by permitting the network operator to earn a return on its massive network investment. Ultimately, these arrangements advance technology and increase the value of the network for all customers. Some of these services might very well qualify as managed or specialized services—the medical telemetry device, for example, or the smart grid service. And, certainly it would be appropriate to exempt these services from the regulations. But even a broad reading of the NPRM's undefined term would not embrace all these arrangements. For example, a device that features a few select "on-deck" applications is likely not a "managed" service, however defined. And some services would simply be difficult to classify. If, as discussed in the previous section, T-Mobile were to partner with a video content provider to offer enhanced transmission of that provider's content—would the resulting service be "managed" or "specialized," and thus exempt? Or would it be a regulated service so long as T-Mobile customers could access it over their handsets or web-browsers? But perhaps the most important concern is the uncertainty with respect to new arrangements that may emerge over time. This is a dynamic marketplace that fosters innovation. Any static definition of "managed services"

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[86] William Lehr, *Mobile Broadband and Implications for Broadband Competition and Adoption*, Broadband for America Whitepaper, at 1 (Nov. 19, 2009), http://www.broadbandforamerica.com/sites/default/themes/broadband/images/mail/LehrMobileandBroadbandCompetition.pdf.

could chill the emergence of new, beneficial arrangements or services, since wireless (and application and content) providers will have no comfort that their plans and arrangements will be permissible and safe from regulation.

IV. THE TRANSPARENCY PRINCIPLE COULD BE UNDULY BURDENSOME IF TAKEN TO AN EXTREME.

T-Mobile supports transparent disclosures to consumers; indeed, every responsible provider should agree with that principle. Thus, T-Mobile and most other major wireless providers adhere to CTIA's "Consumer Code," which requires carriers to "provide consumers with information to help them make informed choices when selecting wireless service, to help ensure that consumers understand their wireless service and rate plans, and to continue to provide wireless service that meets consumers' needs."[87]

Notably, CTIA's Code focuses on disclosure of terms that are material to consumers. This means that consumers have a right to know about any limitations on permissible uses of their wireless broadband service, any bandwidth or data caps, and any measures such as throttling that could affect their use of a service. They likewise should have a meaningful understanding of the advertised speeds and throughput of the service they are purchasing—including the fact that actual speeds may vary due to factors on and off their provider's network. T-Mobile includes disclosures of all this information in the materials it provides to its customers.[88]

Given that providers like T-Mobile and most of its competitors have already responded to market forces and voluntarily adhere to transparency requirements, it is not clear what benefits the Commission's proposed disclosure rule would deliver. And, like any static rule applied to

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87 *See* CTIA, *Consumer Code for Wireless Service*, http://files.ctia.org/pdf/The_Code.pdf.

88 T-Mobile Terms of Service, http://www.t-mobile.com/Templates/Popup.aspx?WT.z_unav=ftr__TC&PAsset=Ftr_Ftr_TermsAndConditions.

rapidly evolving technology, it is likely to have unforeseeable and negative collateral effects. The proposed rule suggests that providers must disclose their actual "network management . . . practices" to ensure that users can enjoy the protections of the open Internet, without shedding light on what the scope of that standard is meant to encompass.[89] To be sure, consumers have a right to understand any restrictions that limit their use of a service and any charges that may apply or limitations in coverage—all of which are covered by the CTIA Code's requirement to disclose material terms. It is unclear whether the NPRM is seeking something more, or why that should be necessary. For example, once T-Mobile discloses that it may reduce a consumer's speed after the 10GB cap has been reached, that consumer has enough information to compare this aspect of T-Mobile's service to those of other carriers and make an educated purchasing (or usage) decision. As the NPRM indicates, the goal of a transparency principle is to ensure access to information "consumers would consider relevant in choosing a service provider or a particular service option."[90] Requiring disclosure of the technical information concerning *how* T-Mobile intends to enforce the speed reduction would add nothing of value to that analysis. On the other hand, disclosure of such information would introduce real risks. It could assist those interested in undermining T-Mobile's network management measures. In essence, a broad reading of the transparency obligation could force system operators to publish a "how to" guide for hackers. To be sure, the Commission does not intend this result. But the proposed rule does not indicate who gets to determine what is "required for users . . . to enjoy the protections" of the Internet freedoms. As with "reasonable" network management, what is "required" and what it means to "enjoy" the open Internet will be the subject of debate and costly litigation.

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89 NPRM, Appendix A § 8.15.

90 NPRM ¶¶ 121, 123.

This is an even more serious concern to the extent the Commission intends to require providers to disclose specific network management practices to content and application providers.[91] As discussed above, T-Mobile and other wireless network providers already offer considerable information and support to developers to help them create content and applications that are optimized for the providers' network and platforms. Handset manufacturers similarly share the relevant APIs to permit applications to be tailored for specific devices. Application and content developers have full access to the usage restrictions and other information that providers disclose to customers. Indeed, those typically are posted on providers' websites. There is no additional category of information that application and content developers need in order to develop successful products for use over providers' network. As noted above, there are already 20,000 applications for the Android platform, there are even more for the iPhone and other platforms, and new ones emerge every day. Carriers have competitive incentives to give applications developers information about their network platforms—and developers plainly are getting all the essential information they need. Of course, certain developers might be keenly interested in the details of individual operator's network management techniques. Such information would be quite helpful for a bad actor seeking to engineer around those limitations to introduce harmful content, viruses, or worms, for example—or to otherwise exploit the network in harmful ways.[92]

The proposed network management disclosure rule also does not take into account the fact that no provider has a defined, static set of immutable network management techniques. Especially in the dynamic wireless environment, these techniques may change constantly.

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91 *Id.* ¶ 127.

92 *See* William Lehr *et al.*, *Scenarios for the Network Neutrality Arms Race* (Feb. 13, 2007), http://www.ftc.gov/opp/workshops/broadband/presentations/lehr.pdf.

Detailed disclosures would thus be quickly out of date. Providers would have to devote significant resources to constantly update their websites and disclosure collateral. Nor could there be some standard way of disclosing network management information, as the Commission proposes, because so many providers use so many different technological platforms and face such different management challenges.[93] Detailed disclosures could also be overly restrictive: it would be harmful if a carrier was handicapped in its ability to deploy a newly identified management technique simply because it had not yet disclosed its intent to employ the technique. Thus, a network disclosure requirement could make sense only if it were interpreted to require disclosures at a general level to allow providers sufficient latitude to engage in any useful management technique. Yet as discussed above, providers already do this. Finally, inaccurate or misleading disclosures can be addressed post-facto; state attorneys general already have pursued wireless broadband providers for failure to disclose meaningful limitations on customers' wireless broadband plans.[94]

V. THE COMMISSION SHOULD NOT REVERSE ITS DETERMINATION THAT IT WOULD LIMIT OPEN ACCESS REQUIREMENTS TO THE C BLOCK.

When the Commission adopted net neutrality rules on wireless broadband access in the context of the 700 MHz C Block, it acknowledged that it had never imposed such rules on other spectrum blocks, and it expressly declined to do so in the context of that proceeding.[95] The Commission wisely recognized that imposing such a requirement could "have unanticipated

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93 *See* NPRM ¶¶ 125, 126.

94 *See* Office of the Attorney General of New York, Press Release, *Verizon Wireless Agrees to Settle Deceptive Marketing Investigation*, Oct. 23, 2007, http://www.ag.ny.gov/media_center/2007/oct/oct23a_07.html (discussing settlement between Verizon Wireless and the New York Attorney General over claims that, despite advertising the service as "unlimited," Verizon Wireless cut off customers for excessive data use).

95 Second Report & Order, *Service Rules for the 698-746, 747-762, and 777-792 Bands*, 22 FCC Rcd 15289, 15364-65 ¶ 205 (2007).

drawbacks," and it therefore determined that "it is appropriate to impose the open platform requirement *only on a limited basis*" to "allow both the Commission and industry to observe the real-world effects of such a requirement" before making any broader determinations.[96]

That experiment has yet to begin—Verizon, which won the license to the C Block at auction, has yet to offer service on that band. Indeed, the spectrum only became available seven months ago. The Commission therefore has not yet had the opportunity to evaluate whether its concerns about the possible "drawbacks" of an open access requirement were—and are—legitimate. As discussed above, T-Mobile believes they were, and that the drawbacks would be even more serious if the rules were applied to the industry at large. The Commission should not move forward before it has done what it sensibly decided to do and evaluate those concerns in a real-world context. Further, it would make no sense for the Commission to do so. Since the Commission last considered this question more than two years ago, the wireless broadband environment has become only more open. There is accordingly even less justification now than there was in the context of the C Block for the Commission to ask the wireless industry to bear the risks and drawbacks of a mandated open access regime.

Accordingly, the Commission should defer action, as it previously decided, until the C Block experiment has played out. In the meantime, as discussed above, the Commission should allocate more spectrum and support the wireless industry's transition to 3G and 4G across the board. As part of its "experiment" the Commission will be in a position to compare the openness of the robust wireless broadband ecosystem at large, *absent* regulation, to the effects of *mandated* openness in the C Block. The Commission and the industry generally would then be

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[96] *Id.* (emphasis added).

able to make a far more informed determination about how net neutrality rules would affect the wireless broadband ecosystem—and whether they are in any way necessary.

CONCLUSION

For all the reasons set forth above, T-Mobile urges the Commission to reject the proposal to apply open access or net neutrality rules, in any form, to wireless broadband Internet access services.

Respectfully,

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