Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Reply Comments – NBP Public Notice #1	)	GN Docket Nos. 09-47, 09-51 and 09-137
Comment Sought on Defining "Broadband"	)	
	)	

REPLY COMMENTS OF ADTRAN, INC.

ADTRAN, Inc. ("ADTRAN") respectfully submits the following reply comments in response to the Commission's Public Notice, which seeks tailored comment on defining "broadband" for the purposes of the Commission's development of a National Broadband Plan.[1] As a telecommunications equipment manufacturer, ADTRAN has a strong interest in the successful and widespread deployment of broadband to all Americans. After a review of the comments submitted in response to the *Public Notice*, ADTRAN submits these reply comments to address two specific items: first, to clarify the relationship between the rate capacity metric proposed by ADTRAN and the speed or throughput metrics proposed by a number of submitters, and to voice our support for both types of metric when used appropriately; and second, to address the proposal submitted by CTIA – The Wireless Association® ("CTIA") that fails to offer a meaningful definition of "broadband."

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[1] Comment Sought on Defining "Broadband", *Public Notice*, DA 09-1842, released August 20, 2009 (hereafter cited as "*Public Notice*").

1. Speed vs. Capacity

In comments filed in response to the *Public Notice*, ADTRAN proposed a metric based on rate capacity per subscriber.[2] A number of other commenting parties have proposed metrics based on measured speed or throughput, rather than rate capacity.[3] In this reply, we make note of the close alignment between these two types of proposals, and of the fact that they complement each other.

ADTRAN encourages the Commission to define "broadband" from the perspective of the subscribers' experience. ADTRAN also believes that the definition should be multidimensional and evolutionary (rather than static). As such, ADTRAN believes that "broadband" should incorporate speed (or throughput) as reflected in the rate that subscribers actually experience or are likely to experience with high probability ("sustainable" speed), as opposed to some theoretical maximum or peak rate. In looking at what speed (or speeds) qualify as broadband, ADTRAN believes that the Commission should base this value on a throughput level that will allow subscribers to use most common classes of applications while not limiting their quality of experience.

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[2] Comments of ADTRAN, Inc., in response to NBP Public Notice #1, August 31, 2009.

[3] Comments of CenturyLink on NBP Public Notice #1, August 31, 2009; Comments of Clearwire Corporation-NBP Public Notice #1, August 31, 2009; Comments of the Fiber-To-The-Home Council, NBP Public Notice #1, August 31, 2009; Comments of Free Press – NBP Public Notice #1, August 31, 2009; Comments of Utopian Wireless Corporation, NBP Public Notice #1, August 31, 2009; Comments of Windstream Communications, Inc. – NBP Public Notice #1, August 31, 2009. In contrast, some of the commenting parties advocated use of "advertised speed." *E.g.,* Comments of NCTA – NBP Public Notice #1, August 31, 2009 at p. 6. ADTRAN has elsewhere explained the flaws with this approach. See Comments of ADTRAN in GN Docket Nos. 09-137 and 09-51, filed September 4, 2009.

While the user's sustainable speed can be measured in a deployed network, it can be notoriously difficult to predict for network architectures in which there is a complex relationship between shared resources, the pool of subscribers sharing those resources, and the traffic demand placed on the network by the subscribers. Because of this, the primary metric used to define broadband prior to physical deployment (for instance, during a proposal or funding phase of a deployment) should be the rate capacity per subscriber. The access network must provide enough capacity, in both the upstream and downstream directions, to meet the traffic demands placed on it by the pool of subscribers it serves. The capacity should be sufficient to handle both diurnal variation in demand and the "burstiness" inherent in user traffic.[4] If an access network provides sufficient capacity per subscriber relative to demand, then the desired sustainable speed can be met or exceeded with a wide range of "peak" rates (so long as the peak meets or exceeds the sustainable value).

Note that "measured speed" could be defined in any number of ways, including average, median, or maximum speed. In this reply, ADTRAN uses the term "sustainable" speed. We recommend that measured speed should reflect a result that subscribers can expect consistently, and not just on an average or even a median basis. The average value in particular can be misleading in that it may be skewed by a few very high results intermixed with many low results. For instance, if a particular service returns one measurement at 11 Mbps and nine measurements at 1 Mbps – a type of result that can

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[4] ADTRAN, *Defining Broadband Speeds: An Analysis of Required Capacity in Network Access Architectures*, White Paper, attached to Letter from Stephen L. Goodman, Counsel for ADTRAN, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 09-51 (filed June 23, 2009).

occur with some network architectures – the average, at 2 Mbps, represents twice the speed that the subscriber actually experiences most of the time! Even the median speed, by definition, is a value that the subscriber experiences only half the time.

We recommend that the sustainable speed be measurable with 90% probability – at this level of confidence, it represents a value that can be applied to applications (such as streaming video) that require sustained throughput to function effectively.

2. Response to CTIA's Comments

ADTRAN was puzzled by the CTIA proposal that the Commission adopt a separate definition of "broadband" for wireless networks based on what is, in essence a tautology – if it is service provided by any current wireless data technology, it should be considered "broadband," regardless of the actual capabilities of the technology or deployment.[5] Under this approach, speed/throughput or quality would be irrelevant to whether a wireless data service qualifies as "broadband." No technical justification is provided for this definition – indeed, CTIA recites a litany of reasons why wireless networks may not be able to provide any particular level of throughput or meet any other quality measures – capacity is constrained by spectrum shortages in some cases; capacity is shared among subscribers within the tower footprint; capacity must be shared with voice services; throughput can be affected by weather, foliage and subscriber equipment. Instead, CTIA attempts to justify its proposal simply because the technologies it promotes provide services that are valued by customers.

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[5] Comments of CTIA – The Wireless Association® to NBP Public Notice #1, August 31, 2009. A similar proposal was also submitted by Qualcomm, Comments of Qualcomm to NBP Public Notice #1, August 31, 2009.

The unreasonableness of CTIA's proposal is readily demonstrated by carrying forward the logic that serves as the foundation for their proposed definition. For example, CTIA asserts that even data services that enable little more than email access should be deemed broadband.[6] Since email access has been enabled by dial modems for nearly twenty years, their "logic" would define dial-up access as broadband, if only it was wireless.[7]

Wireless carriers are certainly free to call wireless data services "wireless data services," but they should not be able to call such services "broadband" unless they can satisfy the associated performance requirements as they are defined by the Commission. Those requirements should assure performance that enables the broad classes of applications currently in use, as well as fostering innovation with regard to future applications.[8] Further, those requirements should be independent of the underlying

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[6] Section 1(a) of comments of CTIA – The Wireless Association® to NBP Public Notice #1, August 31, 2009.

[7] Indeed, we are surprised that SMS (Short Message Service, also known as text messaging) was not included in the wireless data technologies listed in CTIA's definition of "broadband," since it appears to meet all of the criteria set forth:

- It is a formal standard for data transmission,
- It is wireless,
- It is currently deployed by virtually all wireless carriers and enjoys widespread popularity.

[8] *Broadband: Bringing Home The Bits*, The National Academies Press, 2002.

technology. CTIA's proposal directly contradicts all of these principles, and thus should be rejected summarily.

Respectfully submitted,

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