

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	CG Docket No. 09-158
Comment Sought on Measurement of Mobile)	
Broadband Network Performance and Coverage)	CC Docket No. 98-170
)	
)	WC Docket No. 04-36

COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

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much as a 97% drop in speed, followed by a 1,200% increase in a single three minute period even without movement by the consumer. It is a certainty that speeds can vary dramatically. When mobility is added to the equation, the result is even further impacted. Due to this variable nature of broadband data speeds, carriers have each developed a rational, meaningful and technically feasible methodology for disclosing data speeds to customers and provide information about peak and average upload and download data rates, as well as coverage maps that provide granular information on availability and likely speeds in a manner that is usable by consumers.³ Even the Commission recognizes that “[e]xisting voluntary disclosures related to mobile broadband performance and coverage have proven valuable for consumers.”⁴ CTIA hopes that the Commission recognizes that to try and disclose beyond what the carriers already do in this constantly changing environment is both technically infeasible as well as potentially misleading to consumers.

Given this, the Commission should not adopt regulations that require mobile broadband data collection and reporting, as proposed in the Public Notice. Such requirements are unnecessary in this competitive marketplace. Moreover, the data from a mandatory collection – such as “actual speeds” and data derived from inherently-biased “crowd-sourcing” – would be imprecise and would not provide meaningful information to the public or the FCC. Unlike fixed broadband, the unique characteristics of wireless service limit the accuracy and feasibility of large-scale efforts to measure an actual wireless broadband speed.

³ See *id.* at 3 (“Providers of mobile broadband services usually provide coverage maps and ‘up-to’ or ‘typical’ data throughput rates. Third-parties also provide and compile coverage maps for providers (American Roamer) and consumers (Root Wireless).”).

⁴ *Id.*

II. WIRELESS PROVIDERS VIGOROUSLY COMPETE ON ALL FACETS OF CUSTOMER DEMANDS, INCLUDING MOBILE BROADBAND SPEEDS.

Competition in today's wireless market is more vibrant and varied than ever. And, as CTIA previously has established and documents again below,⁵ the robustly competitive wireless marketplace continues to drive significant advances in network speeds and coverage. And, just as competition has spurred greater network speeds and coverage, so too has competition spurred carriers to disclose this information to consumers in as granular a level as is feasible, accurate and informative. Regulations would disrupt the current equilibrium – which has led to both world-leading broadband deployments and record high customer satisfaction levels.⁶

In the race for the future of wireless networks, carriers are utilizing third- and fourth-generation (“3G” and “4G”) technologies to bring even more speed and capabilities to American consumers. As CTIA has said in the past, these advances in technology represent more than a “third pipe to the home,” but a wholly new pipe bringing broadband to the person, wherever and whenever they want it. Recent examples of 4G innovation and investment include:

- Clearwire has deployed and offers 4G wireless broadband in 44 markets across the United States with plans to expand its network to cover up to 120 million people by the end of 2010.⁷

⁵ See, e.g., Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA – The Wireless Association®, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 09-66 (filed Feb. 12, 2010); CTIA Comments, WT Docket No. 09-66 (filed Sept. 30, 2009); CTIA Reply Comments, WT Docket No. 09-66 (filed Oct. 22, 2009).

⁶ A recent FCC survey found that 91% of home broadband users are satisfied with the speed of their service. Specifically, 50% of home broadband users are very satisfied with their home connection speed. And 41% of home broadband users are somewhat satisfied with their home connection speed. John Horrigan, Ellen Satterwhite, *Americans' Perspectives on Online Connection Speeds for Home and Mobile Devices* at 1 (rel. June 1, 2010); News Release, Federal Communications Commission, FCC Survey Finds 4 out of 5 Americans Don't Know Their Broadband Speeds at 3 (rel. June 1, 2010).

⁷ See “Clearwire Brings CLEAR 4G to Merced and Visalia, California”, Press Release, Clearwire.com (July 1, 2010) available at *Footnote continues on next page . . .*

- Sprint has continued its 4G expansion with new service offerings in Chicago, Seattle, Dallas, Charlotte, Philadelphia, Richmond, Salt Lake City, and St. Louis, among other cities.⁸
- In the development and deployment of the Long Term Evolution 4G standard (“LTE”), Verizon Wireless, AT&T, and Cox Communications continue to test their LTE networks.
 - Verizon Wireless announced it would have commercially available 4G service in 30 cities by the end of 2010. Verizon Wireless has completed technical trials of its 4G network and is moving on to user trials in five cities.⁹
 - AT&T will deploy commercial LTE in 2011.¹⁰
- A new entrant into the wireless market, Cox recently announced the successful completion of voice calling and high definition video streaming over wireless networks using LTE technology in Phoenix and San Diego.¹¹ With its new LTE services, Cox

<http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1443337&highlight=> (last accessed July 8, 2010); *see also* “Clearwire Extends 4G Leadership in the United States”, Press Release, Clearwire.com (Mar. 23, 2010) *available at* <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1404906&highlight=> (last accessed July 8, 2010).

⁸ Press Release, Sprint, Sprint Turns on 4G Service in Richmond, Salt Lake City and St. Louis (June 22, 2010), *available at* http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1441980&highlight= (last visited July 7, 2010); Press Release, Sprint, Sprint 4G Blazes into Chicago (Nov. 2, 2009), *available at* http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1349315&highlight= (last visited July 7, 2010).

⁹ Jason Hiner, A Step Closer to 4G: Verizon Moves to “User Trials” in LTE, Tech Republic (June 18, 2010), *available at* <http://blogs.techrepublic.com.com/hiner/?p=5124>.

¹⁰ Marguerite Reardon, *Verizon Expects 4G Launch Next Year*, CNET, (Feb. 18, 2009), http://reviews.cnet.com/8301-13970_7-10166622-78.html (last visited July 7, 2010); Press Release, AT&T, AT&T to Make Faster 3G Technology Available in Six Major Cities This Year (Sept. 9, 2009), *available at* <http://www.att.com/gen/pressroom?newsarticleid=27068&cdvn=news&pid=4800> (“AT&T 3G Press Release”).

¹¹ Press Release, Cox Communications, Cox Successfully Demonstrates the Delivery of Voice Calling, High Definition Video Via 4G Wireless Technology (Jan. 25, 2010), *available at* <http://cox.mediaroom.com/index.php?s=43&item=469> (last visited July 7, 2010).

plans to offer consumers a “quadruple play” – or bundled voice, data, video, and wireless plans.¹²

While competition in the realm of next generation wireless networks heats up, carriers and manufacturers continue to meet consumer demands and provide new services by upgrading existing 3G networks:

- AT&T and T-Mobile are utilizing High Speed Packet Access (“HSPA”) technology to increase speeds across their current 3G networks to 7.2 Mbps.
 - AT&T will roll out HSPA to 25 of the 30 largest markets by the end of 2010, and expand to ninety percent of its network by 2011.¹³
 - In addition to implementing HSPA across its network, T-Mobile has launched HSPA+, a 3.5G technology that not only can deliver peak download speeds of 21 Mbps, but is backward compatible with 3G devices currently on the market.¹⁴ T-Mobile has launched HSPA+ in major markets throughout 2010.¹⁵
- In another effort to bridge the gap between current 3G technology and 4G networks, Qualcomm is now providing wireless device manufacturers with trial versions of its new

¹² Doug Mohney, *Cable Technology – Cox Cable Heats Up Wireless*, CABLE.TMCNET.COM (, Jan. 29, 2010), <http://cable.tmcnet.com/topics/cable/articles/73944-cox-cable-heats-up-wireless.htm> (last visited July 7, 2010).

¹³ AT&T 3G Press Release. AT&T has also completed a software upgrade at 3G cell sites nationwide that has prepareds its network for theoretical maximum possible speeds of 7.2 megabits per second. Press Release, AT&T, AT&T Upgrades 3G Technology at Cell Sites Across Nation (Jan. 5, 2010), available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=30358> (last visited July 7, 2010).

¹⁴ Michelle Maisto, *T-Mobile Debuts WebConnect Jet Modem, Discount Plans*, EWEEK.COM, (Nov. 11, 2009), <http://www.eweek.com/c/a/Desktops-and-Notebooks/T-Mobile-Debuts-WebConnect-Jet-Modem-Discount-Plans-439524/> (last visited July 7, 2010).

¹⁵ *Id.* See also Sacha Segan, *The Fastest Mobile Networks 2010*, PCMag.com (June 3, 2010), available at <http://www.pcmag.com/article2/0,2817,2364263,00.asp> (last visited July 7, 2010).; Press Release, T-Mobile, T-Mobile to Rollout the Nation’s Fastest 3G Wireless Network with HSPA+ to More than 100 Metropolitan Areas in 2010 (Mar. 23, 2010), available at http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20100324&title=%20T-Mobile%20to%20Rollout%20the%20Nation%27s%20Fastest%203G%20Wireless%20Network%20with%20HSPA+%20to%20More%20than%20100%20Metropolitan%20Areas%20in%202010 (last visited July 7, 2010).

multimode chips, which enable consumers to utilize new 4G technologies as well as the prevailing 3G technology.¹⁶

Even as 4G becomes a reality, the wireless industry continues to improve existing networks, increasing coverage and efficiently using spectrum to bring content and services to consumers faster than ever before. The following are just a few recent examples of providers' dedication to network build-out:

- Nex-Tech Wireless, a provider of wireless service in central and western Kansas, deployed new cell towers increasing service coverage in the cities of Osborne and Hays, Kansas,¹⁷ and expanded rural coverage with a new cell site in Hudson, Kansas.¹⁸
- Since April 2010, Bluegrass Cellular has expanded its 3G coverage in Barren County, Muhlenberg County, Breckinridge County, Spencer County, Butler County, Todd County, Pulaski County, and Hardin County in Kentucky.¹⁹

¹⁶ Michelle Maisto, *Qualcomm Partners Testing HSPA+ and 3G, LTE Chips*, EWEEK.COM, Nov. 12, 2009, <http://www.eweek.com/c/a/Mobile-and-Wireless/Qualcomm-Partners-Testing-HSPA-and-3GLTE-Chips-651674/> (last visited July 7, 2010).

¹⁷ Nex-Tech Wireless, Facebook Note, "Nex-Tech Wireless: Wireless Phone Users in Osborne to Experience Improved Coverage," (Dec. 1, 2009), 8:45AM, <http://www.facebook.com/notes/nex-tech-wireless/wireless-phoneusers-in-osborne-to-experience-improved-coverage/186236648014> (last visited July 7, 2010); Nex-Tech Wireless, Press Release, "Nex-Tech Wireless Enhances Coverage in Hays," (December 2009), *available at* <http://www.nex-techwireless.com/news.aspx> (last visited July 7, 2010).

¹⁸ Press Release, Nex-Tech Wireless, Wireless Users in Rural Stafford County to Experience Improved Coverage (May 2010), *available at* <http://www.nex-techwireless.com/news.aspx> (last visited July 7, 2010).

¹⁹ Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Barren County (May 21, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_barren_county2 (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Muhlenburg County (May 21, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_muhlenburg_county (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Breckinridge County (May 21, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_breckinridge_county (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Spencer County (May 21, 2010) *available at* *Footnote continues on next page . . .*

- Union Telephone, a wireless provider in Wyoming, northwestern Colorado and parts of Utah, added sixteen new wireless tower sites in Wyoming and Colorado.²⁰
- Cellular One of East Central Illinois initiated over \$2 million in investment for new cellular towers in the Hutsonville, Annapolis, Palestine, Dundas and Toledo areas in Illinois.²¹
- Appalachian Wireless announced the addition of two new towers in Harlan County, KY.²²
- In the third quarter of 2009, T-Mobile increased its 3G coverage by almost 50% to reach a total of 167 million people.²³
- Cricket expanded its 3G coverage into Lake Charles, its first service offering in Louisiana.²⁴

http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_spencer_county (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Butler County (May 21, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_butler_county (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Todd County, (May 21, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_todd_county (last visited July 7, 2010) ; Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Pulaski County (Apr. 15, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_pulaski_county2 (last visited July 7, 2010); Press Release, Bluegrass Cellular, Bluegrass Cellular Adds 3G Coverage in Barren County (Jan. 12, 2010), Hardin County (Apr. 15, 2010) *available at* http://bluegrasscellular.com/about/news/bluegrass_cellular_adds_3g_coverage_in_hardin_county (last visited July 7, 2010).

²⁰ Union Telephone, Wireless - New Cell Site, <http://www.unionwireless.com/Cellular.aspx?page=Cellular&subpage=New-Cell-Site&SiteID=130> (last visited July 6, 2010).

²¹ Press Release, Cellular One of East Central Illinois, Over \$2 Million in Tower Investments To Enhance Area Cellular One Service (Nov. 11, 2009), *available at* http://www.cellular1.net/downloads/Cell1_new%20towers_11.09.pdf (last visited July 7, 2010).

²² See AppWireless, Twitter (Nov. 15, 2009), <http://twitter.com/appwireless> (last visited July 7, 2010).

²³ Press Release, T-Mobile USA, T-Mobile USA Reports Third Quarter 2009 Results (Nov. 5, 2009), *available at* <http://s.tmocache.com/Cms/Files/Published/0000BDF20016F5DD010312E2BDE4AE9B/5657114502E70FF30124C645BC1131D6/file/TMUS%20Q3%20Press%20Release%20FINAL.pdf> (last visited July 7, 2010).

- Verizon Wireless expanded 3G coverage wireless service in Massachusetts, Maine, New York, Connecticut, New Jersey, Pennsylvania, Vermont, Washington, Oregon, Nevada, Ohio, Illinois, Arizona, Michigan, Hawaii, and California.²⁵

The robustly competitive wireless marketplace continues to drive significant advances in network speeds and coverage. Just as competition has spurred greater speeds and ubiquity, so too has competition spurred carriers to disclose this information to consumers in as granular a level as feasible. And as detailed below, these voluntary, carrier-specific disclosures render unnecessary any perceived need for regulation.

²⁴ Press Release, Leap Wireless, Leap Brings Cricket Unlimited Wireless to Lake Charles, La. (Nov. 17, 2009), *available at* http://phx.corporate-ir.net/phoenix.zhtml?c=95536&p=irolnewsArticle_print&ID=1356548&highlight=.

²⁵ *See, e.g.*, Verizon Wireless, Press Release, Verizon Wireless Expands 3G Wireless Network In Acton, Massachusetts (Oct. 27, 2009), *available at* <http://news.vzw.com/news/2009/10/pr2009-11-23f.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Verizon Wireless Expands 3G Wireless Network In Bethany, Connecticut (Nov. 4, 2009), *available at* <http://news.vzw.com/news/2009/11/pr2009-11-23c.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Verizon Wireless Expands 3G Wireless Network In Northport, Maine (Nov. 5, 2009), *available at* <http://news.vzw.com/news/2009/11/pr2009-11-23d.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Verizon Wireless Expands 3G Network Coverage In Erie County, New York (Nov. 6, 2009), *available at* <http://news.vzw.com/news/2009/11/pr2009-11-11d.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Pocono County, Pennsylvania, Residents Benefit From Verizon Wireless' 3G Network Expansion (July 1, 2010), *available at* <http://news.vzw.com/news/2010/07/pr2010-07-01a.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Warrenton, Oregon, Receives Boost in 3G Wireless Coverage with New Cell Site From Largest U.S. Carrier (June 30, 2010), *available at* <http://news.vzw.com/news/2010/06/pr2010-07-01a.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Coupeville, Washington, Area Receives Boost in 3G Wireless Coverage with New Keystone Harbor Cell Site from Verizon Wireless (June 30, 2010), *available at* <http://news.vzw.com/news/2010/06/pr2010-07-01b.html> (last visited July 7, 2010); Verizon Wireless, Press Release, Mountain View, California, Customers Receive More 3G Coverage with New Verizon Wireless Cell Site (June 30, 2010), *available at* <http://news.vzw.com/news/2010/06/pr2010-07-02a.html> (last visited July 7, 2010).

III. CURRENT INDUSTRY AND THIRD-PARTY REPORTING PRACTICES MOST EFFECTIVELY DELIVER BROADBAND PERFORMANCE AND COVERAGE INFORMATION TO CONSUMERS AND THE FCC.

The wireless industry voluntarily provides broadband performance and coverage information to customers in as granular a fashion as is feasible given the unique characteristics of wireless broadband service. Wireless data rates are extremely dynamic and rapidly changing. Accordingly, many wireless broadband providers have opted to provide consumers information about peak and/or average upload and download data rates, as well as coverage maps that provide detailed information on availability and, in some cases, likely speeds.²⁶ These measurement methodologies are based on well-designed engineering models that take into account statistically significant numbers of data points and operating environments. In addition to industry efforts, third-parties conduct their own studies and publish niche applications that provide additional information to consumers on broadband performance. As detailed in Sections IV and V, *infra*, Commission regulations that would *require* more granular data, as proposed in the Public Notice, could reduce accuracy and would not provide meaningful, reliable information to the public or the FCC. Commission intervention and requirements also would be unnecessarily burdensome on carriers. Accordingly, CTIA urges the Commission to refrain from further regulating the competitive wireless market and to encourage and support current voluntary industry practices and third-party studies.

Wireless providers share detailed information on network coverage and data speeds on their websites, in advertisements, and at points-of-sale. The following is representative of wireless provider educational efforts:

²⁶ See Notice at 3 (“Providers of mobile broadband services usually provide coverage maps and ‘up-to’ or ‘typical’ data throughput rates. Third-parties also provide and compile coverage maps for providers (American Roamer) and consumers (Root Wireless).”).

- Alaska Communications System – Provides coverage maps – one for Alaska Plan and one for Nationwide Plan – that provide consumers with layered readings of service quality (e.g., EV-DO Rev. A, 1xRTT, voice) and lists the maximum and typical upload and download speeds of its different mobile broadband services.²⁷
- AT&T – Provides granular, street-level coverage maps for AT&T’s data, mobile TV, voice, GoPhone, and Smart Limits services. The maps provide consumers with layered readings of service quality and network interfaces (e.g., 3G Mobile Broadband, EDGE/GPRS, Data Connect Pass, Partner EDGE, and Partner GPRS).²⁸ The maps identify the typical speeds in AT&T’s network and explain to consumers what services are usable at those speeds.²⁹
- Bluegrass Cellular – Provides three coverage maps: EV-DO coverage, 38-County Home Coverage, and Nationwide coverage.³⁰ Bluegrass Cellular also provides data on maximum speeds for its services.³¹
- CLEAR – Provides granular, street-level coverage maps for 4G and 3G services that provide consumers with layered readings of service quality and planned areas of service

²⁷ Alaska Communication System, <http://www.acsalaska.com/personal/mobile-internet/plans.asp> and <http://www.acsalaska.com/assets/coverage-maps/ACS-Alaska-Coverage-Map.pdf> (last visited June 17, 2010).

²⁸ AT&T Coverage Viewer, http://www.wireless.att.com/coverageviewer/popUp_3g.jsp (last visited June 17, 2010) (For example, the site explains that using “Partner EDGE: The areas shown in the medium blue striped pattern represent unaffiliated partner network providing Enhanced Data rates for GSM Evolution with typical speeds of 75 to 135 kbps, advanced mobile services like video and music clips, full picture & video messaging, high-speed color Internet access, and email on the move are possible.”).

²⁹ *Id.*

³⁰ Bluegrass Cellular, Coverage Maps, <http://bluegrasscellular.com/network/maps> (last visited June 17, 2010).

³¹ Bluegrass Cellular, Nationwide 3G EV-DO, http://bluegrasscellular.com/network/nationwide_3g_ev_do (last visited June 17, 2010) (explaining that the provider’s 3G service gives you speeds “up to 800+ kbps for phones and up to 1.2+ mbps for PDAs, smartphones and wireless aircards”).

expansion.³² CLEAR also provides data on maximum and average uplink and downlink speeds.³³

- Cricket Wireless – Provides granular, street-level coverage maps – one for data and one for voice – that provide layered readings of service quality (e.g., 3G EV-DO Broadband Modems, 3G EV-DO Broadband-Capable Phones, 1x Phone Data, Nationwide Talk, Tri-Band Phone Required).³⁴ Cricket also provides a tool that illustrates the difference in download speed for an average song over a 3G versus a 2G network.³⁵
- Sprint Nextel – Provides granular, street-level coverage maps – one for data and one for voice – that provide consumers with layered readings of data and voice service quality (e.g., Sprint 4G Network, Sprint 3G network, 3G roaming, Nationwide Sprint Network, data roaming).³⁶ Sprint Nextel also indicates where coverage has recently been extended and where new Sprint 3G cell towers will be located.³⁷ Sprint Nextel also lists the maximum and typical download and upload speeds for its EV DO Rev 0 and other 3G networks.³⁸

³² CLEAR, “CLEAR Coverage Map,” <http://www.clear.com/coverage> (last visited June 28, 2010); CLEAR, “3G Network Coverage Tool,” <http://www.clear.com/index/threegcoveragetool> (last visited June 28, 2010).

³³ CLEAR, “Frequently Asked Questions,” <http://www.clear.com/support/faq> (explaining that CLEAR’s WiMAX offers “bursts over 10 Mbps” and “supports average download speeds up to 3-6 Mbps and upload speeds up to 1Mbps”) (last visited June 28, 2010).

³⁴ Cricket Wireless, <http://www.mycricket.com/coverage/maps/broadband> (last visited June 17, 2010).

³⁵ Cricket Wireless, <http://www.mycricket.com/broadband/what-is-3g> (last visited June 28, 2010).

³⁶ Sprint Nextel, Sprint Coverage Tool, <http://coverage.sprint.com/IMPACT.jsp?INTNAV=ATG:FT:Cov> (last visited June 28, 2010).

³⁷ Sprint Nextel, Sprint Coverage Tool, <http://coverage.sprint.com/IMPACT.jsp?INTNAV=ATG:FT:Cov> (last visited June 28, 2010).

³⁸ Sprint Nextel, “Sprint 3G Network,” http://shop.sprint.com/en/coverage/support/mobile_broadband_network_popup.shtml (last visited June 28, 2010) (“EVDO Rev 0 devices operate at average download speed ranges from 400-700 Kbps with peak rates up to 2.4 Mbps, and at average upload speeds of 40-70 Kbps with peak rates up to 144 Kbps in mobile broadband (EVDO Rev 0) coverage areas. 3G devices operate at average download speed ranges from 600 Kbps - 1.4 Mbps with peak rates up to 3.1 Mbps, and at average upload speeds of 350-500 Kbps with peak rates up to 1.8 Mbps in 3G coverage areas.”); Sprint Nextel, “Compare Data Speeds,” http://shop.sprint.com/en/stores/popups/compare_data_speeds_popup.shtml (last visited June 28, 2010).

- T-Mobile – Provides granular, street-level coverage maps – one for data and one for voice – that provide consumers with layered readings of service quality (*i.e.*, Excellent, Very Good, Good, Moderate, Partner, None).³⁹ These maps also identify the locations of T-Mobile’s HotSpots. T-Mobile also provides data on average and maximum uplink and downlink speeds for its HSPA+, 3G, and EDGE products.⁴⁰
- U.S. Cellular – Provides granular, street-level coverage maps – one for data and one for voice – that provide consumers with layered readings of service quality (*e.g.*, 3G Mobile Broadband Speed, Standard Data Speed, Best, Better, Good, Fair, Partner Coverage) and corresponding information on signal strength depending on whether use is in a building, in a car, or outdoors.⁴¹
- Verizon Wireless – Provides six different granular, street-level coverage maps – Voice & Messaging, Enhanced Services, Push to Talk Verizon, Broadband & V CAST, V CAST Mobile TV, Prepaid, International Coverage, and Broadband 3G Network Comparisons – that provide layered readings of service quality.⁴² Verizon Wireless also provides data on maximum and average uplink and downlink speeds for different products.⁴³

In addition to this wealth of resources available from providers themselves, third-parties also study and report on wireless coverage and service. PC World conducts extensive testing of wireless broadband and publishes charts and articles summarizing mobile broadband data rates,

³⁹ T-Mobile, “Coverage Map,” http://t-mobile-coverage.t-mobile.com/?WT.z_unav=mst_global_cvg&WT.z_unav=mst_shop_coverage# and <http://www.t-mobile.com/coverage/pcc.aspx> (last visited June 17, 2010).

⁴⁰ T-Mobile, http://t-mobile-coverage.t-mobile.com/?WT.z_unav=mst_global_cvg&WT.z_unav=mst_shop_coverage# (last visited June 28, 2010); T-Mobile, <http://t-mobile-coverage.t-mobile.com/network-benefits> (last visited June 28, 2010).

⁴¹ U.S. Cellular, Coverage Indicator, <http://www.uscellular.com/uscellular/common/common.jsp?path=/coverage-map/coverage-indicator.html> (last visited June 28, 2010).

⁴² Verizon Wireless Coverage Locator, <http://www.verizonwireless.com/b2c/CoverageLocatorController?requesttype=NEWREQUEST&coveragetype=broadband> (last visited June 24, 2010).

⁴³ Verizon Wireless, Mobile Broadband – Coverage & Speed, <http://www.verizonwireless.com/b2c/mobilebroadband/?page=coverage> (last visited June 28, 2010).

network performance tests, average upload and download speeds, and reliability.⁴⁴ In December 2009 and January 2010, PC World – partnering with Novarum Inc. – tested the download speeds, upload speeds, and network dependability of the AT&T, Sprint, T-Mobile, and Verizon 3G networks from 20 locations in 13 U.S. cities.⁴⁵ Altogether, PC World “ran more than 51,000 separate tests covering 850 square miles of wireless cell coverage servicing 7 million wireless subscribers.”⁴⁶ Notably, PC World conducted the December 2009 and January 2010 testing using the same locations, methodology, and personnel as in its earlier April 2009 tests.⁴⁷ PC World explains that “[m]aintaining a consistent methodology allowed [it] to compare the performance of the networks across an interval of eight months and look for possible evolutionary changes.”⁴⁸ Similarly, PC Mag has published its own detailed study that compares the networks of AT&T, Sprint, and Verizon. The testing compared theoretical and in-practice

⁴⁴ Mark Sullivan, *AT&T Roars Back in PCWorld’s Second 3G Wireless Performance Test*, PC World (Feb. 22, 2010), available at http://www.peworld.com/article/189592/atandt_roars_back_in_pcworlds_second_3g_wireless_performance_test.html (last visited July 7, 2010) (“*AT&T Roars Back*”).

⁴⁵ In each city, PC World tested from 20 locations situated in a grid over the center of the city. The locations were roughly 2 miles apart, allowing PC World to measure service levels among and between numerous cell towers. See *AT&T Roars Back*. See also PC World, “Smartphone Tests: Performance Results for 13 U.S. Cities,” available at <http://www.peworld.com/zoom?id=189592&page=1&zoomIdx=2> (last visited July 7, 2010) (results from testing speed and reliability of wireless broadband in thirteen cities).

⁴⁶ See *AT&T Roars Back*. For the test, PC World chose cities that “broadly represent the population density, socioeconomic statuses, physical terrain, foliage, and building construction found in medium to large U.S. cities.” The testing cities included Baltimore, Boston, Chicago, Denver, New Orleans, New York City, Orlando, Phoenix, Portland, San Diego, San Francisco, San Jose, and Seattle. *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.* Mark Sullivan, *A Day in the Life of 3G*, PC World (June 28, 2009), available at http://www.peworld.com/article/167391/a_day_in_the_life_of_3g.html (last visited July 7, 2010) (Results from PC World’s April 2009 testing).

speeds and considered how coverage issues vary between metropolitan areas and smaller towns.⁴⁹

These unbiased studies and resources provide valuable insight on mobile broadband performance and speeds. This information supplements carrier disclosures to enable consumers to make educated choices when selecting wireless broadband and obviates the need for burdensome regulation.

IV. WIRELESS NETWORKS ARE NOT READILY COMPARABLE TO WIRED NETWORKS WHEN ATTEMPTING TO MEASURE BROADBAND SPEEDS.

The Commission presumably wants to collect additional information on mobile broadband speeds as a means to draw comparisons with the speeds of fixed broadband service. Although CTIA strongly believes that wireless broadband is a critical element to the nation's broadband connectivity, CTIA cautions the FCC against comparing wireless and fixed broadband services, based on their speeds or other metrics. While both services provide Internet connectivity, fixed and wireless broadband have distinct attributes and distinct limitations due to their underlying technologies. In fact, many consumers subscribe to both services to ensure a comprehensive Internet experience. Wireless broadband is inherently mobile and provides consumers with broadband, wherever and whenever they want access. Fixed broadband – although significantly less flexible – sometimes promises faster speeds than wireless options, which are constrained by spectrum limitations. Indeed, if the Commission is broadly concerned with wireless broadband, it should focus on one of the goals of the National Broadband Plan – finding and allocating additional spectrum for mobile broadband services. The greatest inhibitor

⁴⁹ Sascha Segan, *Battle of the 3G Networks*, PC Mag (June 5, 2009), available at <http://www.pcmag.com/article2/0,2817,2348207,00.asp> (last visited July 7, 2010).

to mobile broadband speeds is lack of capacity – or lack of access to acceptable amounts of spectrum.

Further, unlike fixed broadband, the unique characteristics of wireless service limit the accuracy and feasibility of large-scale efforts to measure actual wireless broadband speed. The Commission recently “recognize[d] that a wireless network has several layers of complexity that are not found in wireline networks, each of which affect the user experience.”⁵⁰ *First*, the capacity of a wireless cell site is shared between all users in the cell. So a user’s actual speed will vary depending on “temporal changes in capacity demand (or loading).”⁵¹ *Second*, the capacity of a cell is shared between all services running over the network. Wireless voice and data use share the finite capacity of the cell. *Third*, wireless networks are RF-based, and subject to blockage and fading unlike wireline networks. And wireless signals “undergo[] different levels of degradation depending on terrain, user mobility and location (indoors vs. outdoors vs. in-car).”⁵² *Fourth*, there is a wide range of end-user device types, which “vary in their peak bandwidth capabilities [and] have different types of antennas [and] form factors.”⁵³

This last item, the user device, may seem trivial, but it is an aspect of broadband speeds that the Commission itself recognizes impacts any attempt at measurement. In the Commission’s

⁵⁰ “The Broadband Availability Gap,” Omnibus Broadband Initiative Technical Paper 1, FCC, at 66, available at Appendix to *In the Matter of Connect America Fund A National Broadband Plan for Our Future High-Cost Universal Service Support*, Notice of Inquiry and Notice of Proposed Rulemaking, FCC 10-58 (rel. Apr. 21, 2010),

⁵¹ *Id.* (“Another factor affecting user experience is the fact that wireless spectrum is shared by all the users in the cell. As a result, a user can experience significant variations at the same position in the cell depending on temporal changes in capacity demand (or loading).”).

⁵² *Id.*

⁵³ *Id.*

ongoing effort to measure the speeds of wired broadband networks, the Commission has partnered with SamKnows to place testing units in consumers' homes to test the speed of their DSL, fiber and cable broadband connections.⁵⁴ As noted in the Commission's Residential PN, SamKnows places its testing device between the consumer's home network and their access provider.⁵⁵ By removing the residential user's equipment as a factor, the SamKnows equipment will get a more accurate reading. The impact of consumer equipment was also noted in a recent paper by MIT's Steve Bauer, David Clark and William Lehr who said that "[w]hile the broadband access network can be the bottleneck, significant bottlenecks arise in home networks, end users' computers, and server side systems and networks."⁵⁶ Thus, the testing equipment is unbiased by the nature of the traffic over the consumer's home network and by the equipment the consumer is using to access the Internet. This same concern would be true for consumer laptops or netbooks with wireless modems attached to them.

In smartphones and wireless-enabled devices, however, the close coupling between the consumer device and the network makes such a solution impossible. Wireless, by its very nature, and as is recognized under the Commission's rules, makes the wireless device a part of the wireless network. This is particularly true with smartphones and wireless-enabled devices. In these devices, all of the functions that would be accomplished by two devices in the home

⁵⁴ *Comment Sought on Residential Fixed Broadband Service Testing and Measurement Solution*, 25 FCC Rcd. 3836 ("Residential PN").

⁵⁵ Residential PN at 3 ("The SamKnows solution operates by having each panelist install a custom piece of hardware with specially designed pre-loaded test software – the SamKnows Whitebox – behind their modem.").

⁵⁶ Steve Bauer, David Clark and William Lehr, *Understanding broadband speed measurements* (June 24, 2010) available at http://mitas.csail.mit.edu/papers/Bauer_Clark_Lehr_Broadband_Speed_Measurements.pdf (last accessed July 7, 2010).

broadband network (user interaction with a computer and network interaction through a modem) are accomplished seamlessly through one device on wireless networks. Separating the network speed component from the processing component of the consumer's chosen device would, at best, provide an inaccurate and confusing data set, and at worst be impossible.

V. USER GENERATED DATA, BY ITS VERY NATURE, WILL BE SUBJECT TO BIAS AND WILL NOT ACCURATELY MEASURE NETWORK SPEEDS.

User-generated data is not an appropriate method for measuring wireless broadband speeds given the inherent bias and lack of rigor associated with such data collection. The Public Notice seeks comment on how user-generated data – such as “crowd-sourcing” – could assist data collection.⁵⁷ CTIA believes such data would be subject to significant voluntary response bias.⁵⁸ Dissatisfied customers are far more likely to test their connections than satisfied customers. The data collected would therefore underestimate overall network performance and fail to reflect actual broadband speeds, making the data of little use to consumers and the FCC.

Moreover, the data collected would not necessarily reflect subscribers' representative customer experience. As detailed in Section IV, at the moment of broadband speed collection, the capacity of the network could be strained or the RF environment could be problematic due to any number of factors – resulting in low measured data rates.⁵⁹ At other times, capacity might free up and RF performance might improve – resulting in higher measured data rates. An

⁵⁷ Notice at 2.

⁵⁸ See, e.g., David C. LeBlanc, *Statistics: Concepts and Applications for Science* at 8 (Jones & Barlett Learning, 2004) (“people who respond are typically not representative of the entire population. People who have strong negative opinions are often more likely to expend the effort to respond than people who have positive opinions.”).

⁵⁹ Specifically, measurements would vary depending on the time of day the measurement is taken, whether the user is indoors or outdoors, and whether the user is in a rural or urban area.

unscientific, but real-world test of wireless network speeds conducted by CTIA in the three days prior to this filing confirmed the concerns expressed above. CTIA tested six devices across the four national wireless broadband providers in CTIA's offices on a publicly available broadband speed test.⁶⁰ For the test, all six devices downloaded the exact same file, using the exact same host. The handsets remained in fixed positions. A test was done every one to two minutes, again without changing locations. The test results varied wildly across networks, across devices and even across the same device on the same network. For example, across the battery of tests, the highest recorded speed was 5.5 Mbps, while the lowest was 138 kbps. Even more telling of the variance in mobile broadband speeds is the fact that both the highest and lowest speeds were recorded on the same device just one minute apart. Two of the devices used in the test were identical models of the same smartphone on the same carrier's network. The speeds of those two devices varied from 442 kbps to 1.8 Mbps, with at least one test showing a more than 200% difference in the speed achieved. Such fluctuations from moment-to-moment illustrate how crowd-sourced data can be unreliable. This type of data is problematic and cannot "protect and empower American consumers by ensuring sufficient access to relevant communications services," as the Public Notice endeavors to do.⁶¹

Separate and apart from concerns regarding the value of this data, CTIA cautions that collecting speed data via crowd-sourcing – and, in particular, collecting user location information – may implicate serious legal, security, and privacy issues. Consumers greatly value their personal information and privacy. Accordingly, wireless carriers protect user privacy from

⁶⁰ CTIA used the Internet Speed Test available at performance.toast.net. Specifically, the "Blue Angels" test on the Clifton Park, NY server.

⁶¹ Notice at 1.

applications that integrate personal information with user location information. Specifically, CTIA and its members have developed *Best Practices and Guidelines for Location-based Services* to protect user privacy as new Location-Based Services (“LBS”) are deployed.⁶² The Guidelines rely on two fundamental principles: user notice and consent. First, potential users must receive meaningful notice about how location information will be used and disclosed. Second, LBS Providers must ensure that users consent to the capture and/or disclosure of location information.⁶³ As described above, because consumers must affirmatively opt-in to location disclosure, this will inherently lead to a biased data set of users who are willing to provide their location to the government for the purpose of broadband speed testing.

Likewise, the Mobile Marketing Association has developed a *Global Code of Conduct* that requires wireless user notice and consent prior to the collection and use of location information by wireless carriers and marketers.⁶⁴

CTIA is concerned that data collection proposals in the instant Public Notice – specifically, proposals to capture individual wireless users’ speed and location data – would threaten customer privacy and conflict with existing industry consumer protection standards, resulting in consumer confusion and harm. No individual’s speed and location data should be

⁶² *Best Practices and Guidelines for Location-based Services*, CTIA – The Wireless Association®, Version 2.0 (March 23, 2010), available at http://files.ctia.org/pdf/CTIA_LBS_Best_Practices_Adopted_03_10.pdf.

⁶³ Ultimately, users must have the right to revoke consent or terminate the LBS at any time. *Id.*

⁶⁴ *Global Code of Conduct*, Mobile Marketing Association (July 15, 2008), available at <http://mmaglobal.com/codeofconduct.pdf> (last visited July 7, 2010). See also “Briefing on Legal Issues Arising from Mobile Marketing Campaigns,” Presentation of Scott D. Delacourt, Mobile Marketing 101, Mobile Marketing Forum New York (June 7, 2010) (discussing the importance of wireless user notice and consent and explaining that the Mobile Marketing Association has developed, in regular consultation with the FTC, self-regulatory guidelines regarding privacy and other consumer protection issues).

captured without consumer notice and consent, which is absent in a compulsory data collection regime. Further, FCC investigation of the privacy implications of the proposed data collection is necessary before the Commission considers promoting or requiring data collection by crowd-sourcing.

VI. IF THE COMMISSION INTENDS TO MOVE FORWARD IN THIS AREA, MORE DETAILED TECHNICAL INFORMATION WILL BE NECESSARY TO FURTHER THE DISCUSSION.

As detailed above, CTIA strongly opposes any FCC regulations that impose additional data collection and reporting obligations on mobile broadband providers. If the Commission nevertheless moves forward, it first should convene a technical working group of interested stakeholders to investigate whether reliable, accurate, and consumer-friendly mobile broadband speed measurements can be collected and reported. The working group would need to evaluate the current data reporting practices of wireless broadband providers. CTIA anticipates that the methodologies used to determine carrier speeds and coverage may vary considerably and may be viewed as proprietary information. And the Commission would need to fully grasp these complexities to ensure that any regulations accommodate differences between carriers and technologies, and protect competitively sensitive information. The working group also would need to examine other issues. For example, how do other countries and international broadband providers report broadband speed and coverage information? The Commission would be remiss to consider adopting regulations without addressing these concerns.

VII. CONCLUSION

For the foregoing reasons, CTIA urges the Commission to support current, voluntary industry data disclosure practices and third-party studies and to not disturb the competitive wireless market with unnecessary and overly burdensome regulations.

Respectfully submitted,

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