



Comments on

**Commercial Mobile Radio Services Market Competition**

WT Docket No. 09-66

Wireless Communications Association International  
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June 15, 2009

## INTRODUCTION

The Wireless Communications Association International (“WCAI”), the trade association of the wireless broadband industry, submits these comments on the Public Notice released by the Wireless Telecommunications Bureau on May 14, 2009.<sup>1</sup>

WCAI commends the Commission for its continuing efforts to improve its CMRS Competition Reports, which are an invaluable source of industry data and analysis. Although the Commission has in recent years done extraordinary work to improve the granularity of data within the report, more granularity regarding networks operating in unlicensed spectrum is needed to analyze “effective competition.” Similarly, although the Commission in recent years has made additional spectrum available for mobile services, even more spectrum will be needed to meet the increasing consumer demand for mobile broadband. The majority of consumers now consider the mobile phone the technology device that would be “hardest to do without” and would substitute their Internet usage on a PC for a mobile device. To understand whether this preference for mobility is affecting intermodal broadband competition, the Commission should attempt to quantify the degree to which mobile broadband may be a substitute for wireline broadband.

Implementing these additional elements will further understanding of the mobile broadband marketplace and make this year’s report the most comprehensive the Commission has ever produced.

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<sup>1</sup> Public Notice, Wireless Telecommunications Bureau Seeks Comment on Commercial Mobile Radio Services Market Competition, WT Docket No. 09-66 (rel. May 14, 2009).

## DISCUSSION

### **A. The Commission should provide more granular data regarding the deployment and usage of broadband networks operating in unlicensed and hybrid spectrum.**

In recent CMRS Competition Reports, the Commission has provided increasingly more granular analysis regarding mobile broadband deployment. However, additional data is required to better understand mobile broadband service deployment and spectrum issues related to mobile broadband competition.

In this report the Commission should provide coverage maps at the census block level depicting commercial broadband service deployment in unlicensed and “hybrid” spectrum bands (i.e, the 3.65 GHz band). The Commission should also include data regarding the number of consumers that subscribe to broadband networks that rely solely on unlicensed and “hybrid” spectrum and the services being provided on those networks. Data in the Commission’s CMRS Competition Reports are often used as a valuable reference in debates regarding spectrum allocation and licensing methodologies. Those debates have long focused on the appropriate mix of licensed and unlicensed spectrum; yet no report has attempted to quantify broadband deployment, use, and services in unlicensed spectrum bands. There simply is no reliable data regarding broadband networks using unlicensed spectrum. With increasing convergence between licensed and unlicensed networks, and calls for even more unlicensed spectrum allocations, now is the time for the Commission to include such data in the CMRS Competition Report.

Coverage maps depicting unlicensed network deployment are essential to understanding wireless deployment and informing the spectrum allocation debate

that is currently occurring in the context of the national broadband plan proceeding. For example, some commenters in the national broadband plan proceeding have asserted that unlicensed spectrum results in greater spectrum utilization than licensed spectrum.<sup>2</sup> These commenters do not, however, provide any data supporting this assertion. Because the Commission does not produce coverage maps for networks operating on unlicensed spectrum or data regarding the number of subscribers using such networks or the services provided, there does not appear to be any way to compare service deployment in licensed and unlicensed bands.

To enable a better understanding of wireless deployment, the Commission should include in this year's report coverage maps of commercial broadband service deployment in unlicensed and "hybrid" spectrum bands. To avoid false comparisons, these coverage maps should use the same methodology the Commission uses to produce coverage maps for licensed spectrum – i.e., the maps should be produced at the census block level. The Commission should also include data regarding the number of consumers that subscribe to broadband networks that rely solely on unlicensed spectrum and the services provided with those networks. Even if coverage maps were available for unlicensed broadband service deployments, without subscription and service data there would be no way to determine the level and type of usage of such networks.

**B. Consumers value mobility more highly than broadband access at home.**

The Commission should recognize in this report that consumers value mobility more highly than access at home. PEW research indicates that the majority

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<sup>2</sup> See Comments of Public Knowledge, et al., GN Docket No. 09-51, at 31 (filed Jun. 8, 2009).

of consumers now consider the mobile phone the technology device that would be “hardest to do without.”<sup>3</sup> This conclusion is not limited to mobile “phones.” According to an IBM study released last fall, over 50 percent of consumers would substitute their Internet usage on a PC for a mobile device.<sup>4</sup> These independent sources both confirm that the majority of consumers now prefer mobile connectivity to being a “PC couch potato.”

Consumers are not only voting for mobility in the polls, they are voting for mobility with their wallets. The latest CMRS Competition Report indicates that in 2008 approximately 18% of U.S. households were *mobile only*.<sup>5</sup> This compares to only 14% of the total population (including children) that did not have a mobile device at year-end 2007.<sup>6</sup> The recent report from the Center for Disease Control found that by the end of 2008 over 20% of the nation’s households had “cut the cord,” representing “the largest 6-month increase observed since NHIS began collecting data on wireless-only households in 2003.”<sup>7</sup> Those that rely solely on mobile access now outnumber those who do not have mobile access at all – a trend that is continuing to accelerate.

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<sup>3</sup> “The cell phone went from the device that was the fourth ‘hardest to do without’ in 2002 to the number one slot in 2007.” John B. Horrigan, *The Mobile Difference*, Pew Internet and American Life Project, at 97 (Mar. 25, 2009) (available at <http://www.pewinternet.org/Reports/2009/5-The-Mobile-Difference--Typology.aspx>).

<sup>4</sup> *IBM Study Finds Consumers Prefer a Mobile Device over the PC*, press release (rel. Oct. 22, 2008) (available at <http://www-03.ibm.com/press/us/en/pressrelease/25737.wss#feeds>).

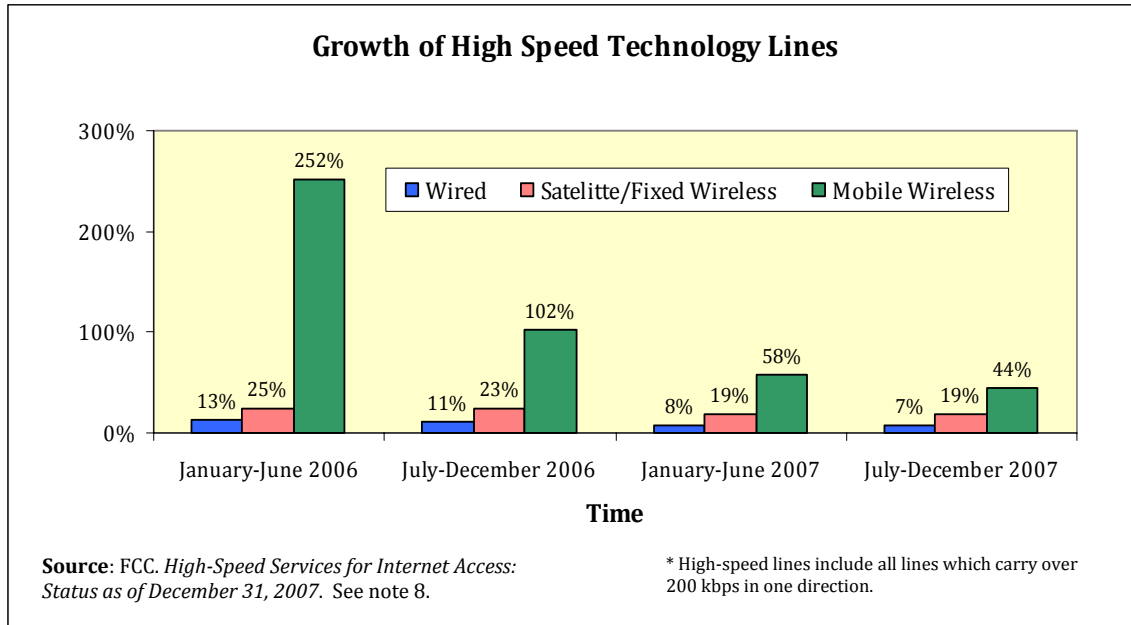
<sup>5</sup> See *Thirteenth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, DA 09-54, at para. 230 (rel. Jan. 16, 2009) (“13<sup>th</sup> CMRS Competition Report”).

<sup>6</sup> *Id.* at pp. 6-7.

<sup>7</sup> See Blumberg & Luke, Div. of Health Interview Statistics, Nat’l Ctr. for Health Statistics, CDC, *Wireless Substitution: Early Release of Estimates from the National Health Interview Survey, July-December 2008*, at 1 (May 6, 2009).

As shown in Figure 1, in the United States, wireless broadband is both relatively and absolutely the fastest growing segment of broadband in the U.S.<sup>8</sup>

**Figure 1**



The growth of broadband wireless smart phones almost doubled in one year, from 12% of handset sales at the end of 2007 to 23% of all U.S. handset sales at the end of 2008, led by AT&T's iPhone;<sup>9</sup> and “[m]obile Internet penetration is higher in the United States (15.6 percent of wireless subscribers) than in Western European countries.”<sup>10</sup> The growth in the netbook market segment is also part of this “larger shift from stationary to mobile computing.”<sup>11</sup> It is estimated that almost *thirty times*

<sup>8</sup> See *High-Speed Services for Internet Access: Status as of December 31, 2007*, Industry Analysis and Technology Division, Wireline Competition Bureau, at 8 (Jan. 2009). (available at [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-287962A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-287962A1.pdf)).

<sup>9</sup> *The NPD Group: Despite Recession, U.S. Smartphone Market is Growing*, Press Release (rel. Mar. 3, 2009) (available at [http://www.npd.com/press/releases/press\\_090303.html](http://www.npd.com/press/releases/press_090303.html)).

<sup>10</sup> 13<sup>th</sup> CMRS Competition Report, *supra* note 5, at p. 10.

<sup>11</sup> Randall Stross, *The PC Doesn't Have to Be an Anchor*, New York Times (Apr. 18, 2009) (available at <http://www.nytimes.com/2009/04/19/business/19digi.html? r=3>).

more netbooks were sold in 2008 (11.4 million) than in 2007 (400,000).<sup>12</sup> “The inert desktop is as aptly called a ‘personal computer’ as a grandfather clock is called a ‘personal time-keeping device.’ It’s always at your service — until you leave the room.”<sup>13</sup>

Although it is not surprising that consumers prefer mobility when they can achieve it, it may be surprising that they prefer it even now, before next-generation mobile wireless broadband networks have been widely deployed. The consumer preferences discussed above are based primarily on the 2G and 3G networks that are more widely available today. With the capabilities provided by next-generation 4G wireless broadband networks, the consumer preference for mobility will only increase.

**C. Mobile wireless broadband must have access to more spectrum to meet increasing consumer demand.**

To support the most advanced mobile broadband services, mobile broadband networks require significantly more spectrum and wider contiguous bandwidths than traditional cellular networks. As depicted in Figure 2 on the following page, a traditional handheld device, with average customer usage patterns, will consume about 30 megabytes of data in a month.<sup>14</sup> A single smart

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<sup>12</sup> See <http://en.wikipedia.org/wiki/Netbook>.

<sup>13</sup> Randall Stross, *The PC Doesn't Have to Be an Anchor*, *supra* note 11.

<sup>14</sup> See *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update*, White Paper, at 3 (Jan. 29, 2009) (available at [http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white\\_paper\\_c11-520862.html](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html)).

phone is consuming 30 times that amount, and a single connected notebook or laptop computer is consuming 450 times that amount.<sup>15</sup>

**Figure 2**

<b>Device</b>	<b>MB/Month</b>
Regular Phone	30
Smart Phone	900
Laptop	13,500

**Source:** Cisco Virtual Networking Index. See note 14.

Given that smart phones constituted only 23% of all U.S. handset sales at the end of 2008, but are rapidly increasing in market share, the trend toward higher bandwidth usage is quickly accelerating.<sup>16</sup>

The continuing emergence of wireless applications that more fully integrate broadband into our daily lives will generate even more demand for contiguous wireless broadband spectrum than we have today. As shown in Figure 3 on the following page, Cisco estimates that mobile data traffic in North America will increase 129 percent from 2008 to 2013.<sup>17</sup>

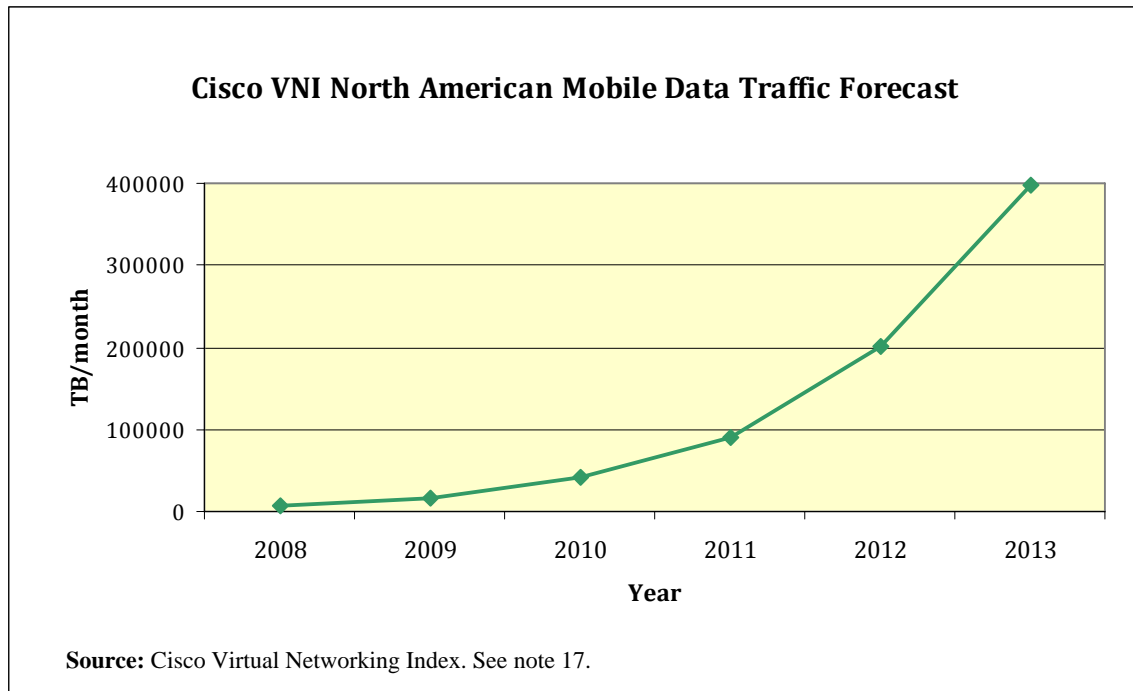
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<sup>15</sup> *See id.*

<sup>16</sup> *See The NPD Group, supra* note 9.

<sup>17</sup> *Cisco Visual Networking Index, supra* note 14, at 6 (Appendix A, Table 1).

**Figure 3**



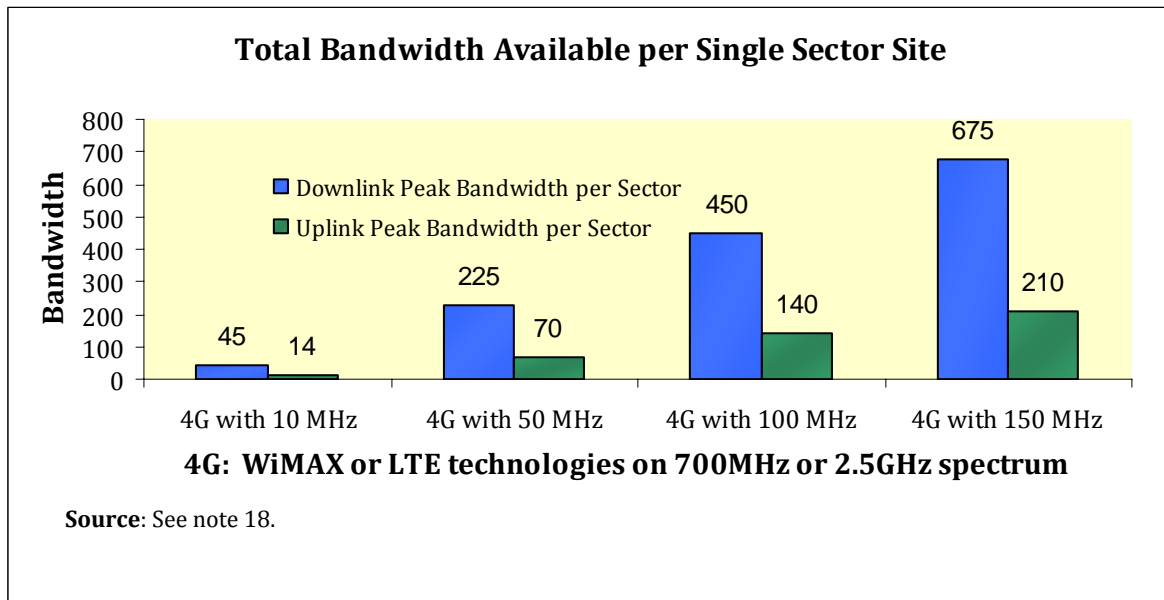
As traffic increases, so does spectrum use.

Although no one can accurately predict how much additional spectrum will be required to support robust competition in a world with “everyware” computing, more spectrum will be needed to meet increasing capacity requirements. Figure 4, on the following page, provides a sense of the scope of this problem by demonstrating the fundamental relationship between spectrum and capacity.<sup>18</sup>

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<sup>18</sup> This analysis assumes downlink rates of 4.5 bits per hertz downlink and 1.4 bits per hertz uplink and the use of advanced technologies to mitigate self-interference among sectors (i.e., a reuse of one). Real-world conditions would likely produce lower average throughput; however, this is an example of the type of analysis necessary to better understand the relationship between spectrum needs and increases in demand.

Figure 4



Using next-generation, 4G technologies with 150 MHz of spectrum, a mobile wireless broadband provider can *theoretically* deliver 675 Mbps of capacity per single sector site, which means that such a site could theoretically support 67 consumers simultaneously using 10 Mbps of downlink capacity each. These theoretical throughput rates go down drastically as the amount of available spectrum drops and due to a number of other real-world factors, including the level of frequency reuse, topography, and the location and speed of movement of the user. WCAI also recognizes that cell size (e.g., femto cells), technology, and other factors affect capacity; however, these factors have practical limits.

Even the “best case” scenario discussed above demonstrates that spectrum constraints present a significant challenge for mobile wireless broadband. In rural areas with low population density (less than 100 persons per square mile),<sup>19</sup> the potential for network overload is less acute, as there are typically fewer consumers

<sup>19</sup> 13<sup>th</sup> CMRS Competition Report, *supra* note 5, at Map B-33.

per site. In densely populated areas, however, the situation is potentially severe. In urban areas like Manhattan, which has a population density of 69,873 persons per square mile,<sup>20</sup> there are significant numbers of users per site and an impending spectrum shortage.

If current trends in data growth continue, it is likely that mobile broadband providers will each require 150 MHz or more of licensed spectrum to adequately meet consumer needs. The entire spectrum allocation that is theoretically available and that the Commission currently considers suitable for mobile broadband service is only approximately 425 MHz.<sup>21</sup> This limited amount of spectrum would not support even three mobile broadband service providers using 150 MHz of spectrum each. To remedy this situation, the Commission must make significantly more spectrum available for mobile broadband use.

**D. The Commission should attempt to quantify the degree to which mobile broadband may be a substitute for wireline broadband.**

Although the Commission has long tracked wireless substitution for wireline services, the Commission has not traditionally tracked substitution of mobile broadband services for wired broadband services. This is not surprising given the substantial evidence that mobile broadband and wired broadband appear to be

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<sup>20</sup> See <http://www.demographia.com/dm-nyc.htm>.

<sup>21</sup> See *Sprint Nextel Corp. and Clearwire Corp.*, Memorandum Opinion and Order, FCC 08-259, at paras. 53-74 (rel. Nov. 7, 2008). In calculating this amount for the mobile broadband spectrum input market, the Commission included only the Cellular, SMR, Broadband PCS, 700 MHz, AWS-1, and 55.5 MHz of the BRS bands. See also 13<sup>th</sup> CMRS Competition Report, *supra* note 5, at para. 69, Table 5 (describing bands that are potentially available for mobile services).

complementary rather than substitutable products.<sup>22</sup> Nevertheless, because substitutability is an important element of competitive analysis, the Commission should attempt to quantify the degree to which mobile broadband may be a substitute for wireline broadband.<sup>23</sup> This analysis is especially important today when the Commission is developing a national broadband plan and other agencies will be making stimulus funds available for broadband, because wireless broadband is so much more cost-effective than wired broadband.

Mobile wireless broadband networks maximize both capability and affordability to sparsely-populated rural areas and to low income consumers in urban centers. First, in regard to “speed,” mobile wireless broadband is capable of meeting the needs of the vast majority of users.<sup>24</sup> Next-generation mobile wireless broadband networks already offer throughput similar to that available on DSL and DOCSIS 1.0 networks. AT&T recently announced that beginning later this year it will be upgrading its 3G network to High Speed Packet Access (HSPA) 7.2 technology, which offers theoretical peak “speeds” of 7.2 Mbps.<sup>25</sup> The ability of next-generation wireless networks to provide such capability is not, however, merely theoretical. Clearwire recently conducted a 30-minute drive test of its operating WiMAX network in Portland, Oregon, and measured a mean downlink rate

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<sup>22</sup> See Comments of Consumer Federation of America, et al., GN Docket No. 09-51, at 20-22 (filed Jun. 8, 2009) (“Consumer Federation Comments”).

<sup>23</sup> See Comments of Technology Policy Institute, GN Docket No. 09-51, at 3-4 (filed Jun. 8, 2009).

<sup>24</sup> Comments of the Consumer Federation of American, et al., Report on Rural Broadband Strategy, GN Docket No. 09-29, at 4 (filed Mar. 25, 2009).

<sup>25</sup> See *AT&T to Deliver 3G Mobile Broadband Speed Boost*, Press Release (rel. May 27, 2009) (available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26835>).

of more than 6 Mbps and mean latency less than 100 milliseconds. While this throughput is impressive, mobile broadband throughput will continue to increase as technology advances. In the near future, WiMAX and LTE networks are expected to offer theoretical peak “speeds” of over 100 Mbps.<sup>26</sup>

Even more important than “speed” is mobility, a uniquely wireless capability. In the Clearwire drive test discussed above, the vehicle averaged 35 mph and hit a maximum speed of 55 mph while achieving impressive broadband throughput. The ability to access the Internet at 6 Mbps while driving 35 mph is why “[m]obile access to the internet constitutes an inflection point in technology adoption.”<sup>27</sup> With such capability consumers are finally be able to access all of the features and capabilities of the Internet anywhere – in the bus, on the train, or sitting in the park during lunch – and give “always on” a whole new meaning.

Given these superior capabilities, one would expect mobile wireless broadband to be more expensive than less capable alternatives. Fortunately, the opposite is true. Wireless broadband networks can typically be built more quickly than wired networks and at significantly lower cost. Figure 5, on the following page, compares rural FTTH (GPON) to 4G wireless deployment (WiMAX) versus take-rate.<sup>28</sup>

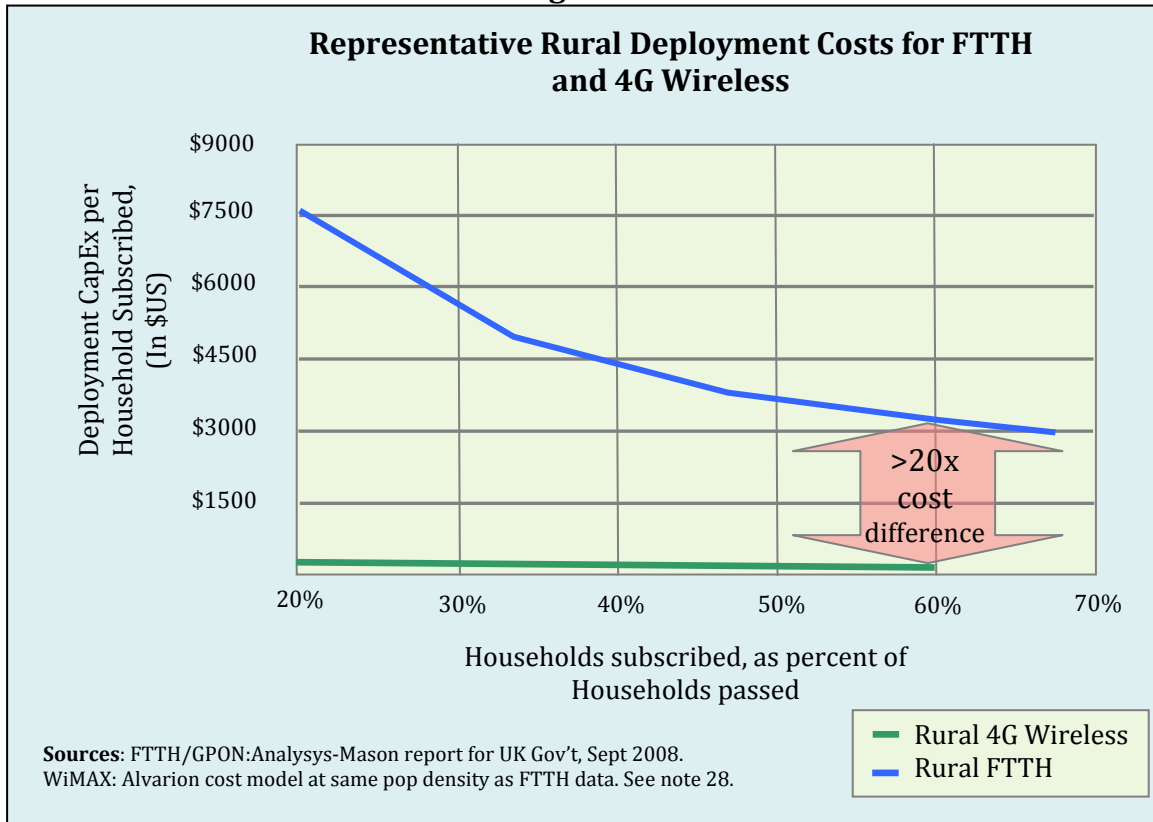
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<sup>26</sup> See <http://en.wikipedia.org/wiki/WiMAX>.

<sup>27</sup> Horrigan, *The Mobile Difference*, *supra* note 3, at 97.

<sup>28</sup> The FTTH data is derived from an Analysys-Mason report commissioned by the UK. See Analysis Mason, *The costs of deploying fibre-based next-generation broadband infrastructure*, at 4 (rel. Sep. 8, 2008) (available at <http://www.broadbanduk.org/content/view/303/7/>). (Note that the original pricing data is in GBP, and the exchange rate used in the conversion was 1000 GBP=1464 \$US.) The 4G curve is derived from a 4G cost model developed by

Figure 5



This graph demonstrates that, even assuming an ambitious 60% take rate, the cost of FTTH deployment in rural areas would be approximately 20 times the cost of 4G deployment.

In addition to the difference in cost between fiber and wireless, this graph demonstrates that the fixed costs of deploying new infrastructure far outweigh the variable costs, which “means that the cost per home connected is highly dependent on the level of take-up.”<sup>29</sup> Because, as noted above, consumers have expressed a preference for mobile Internet access, this factor should be especially relevant to policymakers as they consider broadband deployment in rural areas. With the

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Alvarion Ltd., which has been adjusted for the same population density (approx 300 households per square mile) as the FTTH curve.

<sup>29</sup> Analysis Mason, *id.* at 4.

continuing trend toward wireless substitution, it seems likely that take rates for mobile wireless broadband would exceed take rates for FTTH in rural areas, which would further exacerbate their cost differential. Given the high cost of fiber at relatively modest take rates, and the growing availability of wireless broadband networks, policymakers should not adopt a “build it and they will come” philosophy for FTTH deployment in rural areas.

This is especially relevant given that consumers will ultimately bear the cost of such deployment, either through higher prices or consumer-funded subsidy mechanisms. Due to their significantly lower cost, mobile wireless broadband networks are not only more capable than wired networks, they are also more affordable for consumers and more sustainable than wired networks, especially in rural and low income regions where initial broadband take rates may be lower than in urban areas.

## **CONCLUSION**

WCAI requests that the Commission provide the additional data and analysis described in these comments and hopes that the data provided assists the Commission in preparing this year’s report.

Respectfully submitted,  
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