Office of Ratepayer Advocates
California Public Utilities Commission

Office of Ratepayer Advocates Testimony Regarding Fixed Wireless Broadband Service

San Francisco, California
June 1, 2016
MEMORANDUM

This report was prepared by Tony Tully of the Communications & Water Policy Branch of the Office of Ratepayer Advocated (ORA) under the general supervision of Program & Project Supervisor, Ana Maria Johnson. ORA is represented in this proceeding by legal counsel, Travis Foss.

A statement of qualifications of Tony Tully is presented in Attachment A to this testimony.
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EXECUTIVE SUMMARY

The following testimony presents ORA’s findings in response to the California Public Utilities Commission (CPUC) Order Instituting Investigation (I.) 15-11-007 Information Request (IR) #9. IR #9 asks to “… describe the extent to which wireless and wireline services are substitutes for one another, or separate market, based on you experience and on such evidence and documentation that you can apply” including if there are barriers to such substitution, and what are the limits of such substitution. Due to its limited availability, technological and geographical constraints, and substantially higher price, fixed wireless broadband cannot be considered a close substitute for fixed wireline broadband services.

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1 | I.15-11-007, Order Instituting Investigation to Assess the State of Competition Among Telecommunications Providers in California, and to Consider and Resolve Limited Rehearing of Decision (D.) 08-09-042, November 5, 2015, Attachment B, page B-4.
I. INTRODUCTION

ASSESSMENT OF THE SUBSTITUABILITY OF FIXED WIRELESS BROADBAND FOR FIXED WIRELINE BROADBAND

INTRODUCTION

With the lack of broadband availability in rural areas, customers have few options for broadband service. Small fixed wireless broadband providers, having to make little investment, have been able to provide partial coverage to these areas. But, for most Californians, fixed wireless broadband service cannot be considered a substitute for fixed wireline broadband due to its limited availability, technological and geographical constraints, and substantially higher price.

This report presents research on the technological limitations of fixed wireless broadband compared to fixed wireline broadband that addresses the elements of such limitations:

- Availability (only available in parts of the state but even in a community where the service is available, not all houses can get it)
- Geographical constraints (i.e. line of site)
- Speed comparison to fixed wireline broadband
- Comparison of fixed wireless pricing to fixed wireline broadband

In addition to this report, the 2016 FCC Broadband Progress Report found that fixed broadband services that connect users to the Internet using wireless transmission pathways, such as fixed satellite and fixed wireless service, are adopted by less than three percent of residential fixed broadband subscribers nationwide.\(^2\) The same report found that fixed wireless was a complement for many but not a substitute to fixed wireline.\(^3\) In another FCC report, it was found that fixed wireless broadband accounts for less than 1% (0.1299%) of the total service connections specifically in California.\(^4\)

\(^3\) FCC, 2016 Broadband Progress Report, January 29, 2016, page 18, footnote 125.
II. DISCUSSION

A. FIXED WIRELESS BROADBAND SERVICE AVAILABILITY IS LIMITED

One of the most appealing benefits of fixed wireless broadband is its availability in areas not served by fixed wireline broadband. Fixed wireless service providers are not required to invest heavily in new cable and infrastructure, making it a cost effective choice for offering broadband services to rural and difficult to reach customers.

Using the CPUC’s California Broadband Availability map, Attachments B and C provide a snapshot view of fixed wireless and fixed wireline broadband service in California. The coverage maps in Attachment B represent Northern California while Attachment C represents the coverage maps for Southern California. In each figure, the fixed wireless coverage map is on top and fixed wireline is below. These geographic maps provide the following information:

- Because fixed wireless broadband requires line of site from a transmitter to receiver, customer service areas are never fully served due to obstructions.
- Urban areas in California are mostly underserved by fixed wireless broadband leaving customers without alternatives to fixed wireline broadband.
- Fixed wireless broadband typically serves rural, less populated areas not served by fixed wireline broadband services.
- In rural areas, fixed wireline broadband service providers are generally not present.
- Many Californians in rural areas remain unserved by either fixed wireless or wireline broadband services.

B. FIXED WIRELESS BROADBAND IS SUBJECT TO GEOGRAPHICAL CONSTRAINTS

Because fixed wireless broadband requires comparatively little infrastructure investment compared to fixed wireline, it is easy to install and allows some customers access to broadband services in rural areas where fixed wireline broadband services are not available. However, fixed wireless broadband has geological limitations that continue to leave many Californians in rural areas unserved.
Fixed wireless consists of a radio receiver which is installed on a home or business that connects, point-to-point, to a radio antenna/tower outside the home. The home radio receiver is generally placed somewhere outside near the top of the building, generally mounted on the roof of a home/business or the chimney. Inside wiring/cable is then run from the receiver outside your house to your computer. If the customer has a network card, no additional equipment is required. This unit communicates with an access point, which connects the client to the Internet through a high-speed backbone.\(^5\) While transmitting broadband signals through the air may seem a favorable option to running lines either on utility poles or underground, the significant technological limitation of fixed wireless broadband is that the radio receiver at the consumer's premises and the broadband access point must have a direct line of sight. This can be problematic in rural areas with mountains, hills, trees, buildings and electrical problems.

In Attachments B and C, the unserved areas highlighted in red are mostly in mountainous areas. The lines of sight in these regions have obstructions that can prevent many customers from receiving wireless broadband services including, mainly, mountains, hills and trees.

Fixed wireless broadband providers in urban areas also have limitations. While urban areas may have fewer issues with mountain, hills and trees, signals can be blocked or disrupted by buildings and electrical problems from city infrastructure and prove even more difficult to circumnavigate.

With little to no possibility that a fixed wireless broadband signal can fully serve a complete area, the green areas on the fixed wireless broadband maps in Attachment B and C only list areas as partially served. So, a customer with access to fixed wireless broadband service may have a neighbor right next door that may not have access due to obstructions blocking line of sight to the transmitter. Customers whose line of site is obstructed are either denied service or, in some cases, may have to pay an additional cost to have equipment installed to help them get the service.\(^6\) These issues are generally noted on most fixed wireless broadband provider websites.\(^2\)

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\(^5\) [http://www.smarterbroadband.com/FAQ.htm](http://www.smarterbroadband.com/FAQ.htm)
\(^6\) [http://www.smarterbroadband.com/Availability.htm](http://www.smarterbroadband.com/Availability.htm)
C. FIXED WIRELESS BROADBAND DOES NOT PROVIDE FAST SPEEDS COMPARED TO FIXED WIRELINE BROADBAND

The most significant technological limitation of fixed wireless broadband service is speed. As shown in Figure 1, of the 47 known fixed wireless broadband service providers located throughout California (see Attachment D), only 8 companies advertise download speeds of 25 Mbps. Most companies only offer speeds that are far inferior to the maximum download speeds offered by fixed wireline broadband providers and fail to meet the FCC definition of broadband which is speeds of 25 Mbps download and 3 Mbps upload. Only three known fixed wireless broadband providers go beyond 25 Mbps download, including Softcom Internet Communications, Etheric Network, and AeroSurf.

Figure 1: Broadband Speeds and Availability Comparison

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5 The data used in Figures 1 and 2 is from the 36 of 47 fixed wireless service providers who advertised data on their websites and are listed in Attachment D. This list is a compilation of California service providers that have provided data used in the broadband service map at www.broadbandmap.ca.gov. 477 data and have been found in web searches. Fixed wireline broadband service providers include AT&T, Comcast and Time Warner Cable.


10 https://www.softcom.net/services/highspeed.html. It is also advertised that it can “custom tailor” download speeds up to 300 Mbps, but do not give any details or pricing.

11 http://ethericnetworks.com/rural-high-speed-internet/

12 http://www.aerosurf.net/plans.asp
D. LACK OF COMPETITION IN RURAL AREAS HAS RESULTED IN
HIGHER PRICES FOR RESIDENTIAL FIXED WIRELINE
BROADBAND SERVICE

When it comes to residential broadband service in California, many consumers lack
choices and, at times, are faced with the only choice of a fixed wireless provider. As a result, the
lack of competition has driven up the cost of fixed wireless broadband service. A comparison of
broadband service prices between fixed wireless and fixed wireline shown in Figure 2 illustrates
how customers with fixed wireless pay a significantly higher price for service and how that price
gap increases with higher speeds.¹³

For customers with fixed or low income, fixed wireless may not be an option. On the
lower end of speeds, customers must pay an average of $61 a month for 1 Mbps. Upgrading
service to an average $100 per month service package would only get you 7 Mbps. For
customers that can afford higher speeds, value is not an option. As an example, the monthly
residential service cost of the three fixed wireless companies who offer download speeds greater
than 25 Mbps are between $200 to $500 dollars per month. These companies include Softcom
Internet Communications at $500 per month¹⁴, Etheric Networks at $220¹⁵ and AeroSurf at
$200¹⁶. These prices far exceed the price of fixed wireline broadband services for the same
speeds, which start at an average of $58 a month for companies such as AT&T, Comcast and
Time Warner Cable that offer fixed wireline broadband service.

¹³ The data used in Figures 1 and 2 is from the 36 of 47 fixed wireless service providers who advertised data on their
websites and are listed in Attachment D. This list is a compilation of California service providers that have provided
data used in the broadband service map at www.broadbandmap.ca.gov, 477 data and have been found in web
searches. Fixed wireline broadband service providers include AT&T, Comcast and Time Warner Cable.
¹⁴ https://www.softcom.net/services/highspeed.html
¹⁵ http://ethericnetworks.com/rural-high-speed-internet/
¹⁶ http://www.aerosurf.net/plans.asp
Due to its limited availability, technological and geographical constraints, and substantially higher price, fixed wireless broadband cannot be considered a close substitute for fixed wireline broadband services.
ATTACHMENTS
ATTACHMENT A

QUALIFICATIONS AND PREPARED TESTIMONY OF TONY TULLY

Q.1 Please state your name and business address.
A.1 My name is Tony Tully. My business address is 505 Van Ness Avenue, San Francisco, California, 94102.

Q.2 By whom are you employed and in what capacity?
A.2 I am employed by the California Public Utilities Commission (CPUC) in its Office of Ratepayer Advocates (ORA) as a Public Utility Regulatory Analyst IV.

Q.3 Briefly describe your pertinent educational background.
A.3 I graduated from the University of Phoenix with a bachelor’s degree in Business Management.

Q.4 Briefly describe your professional experience.
A.4 Prior to joining the CPUC, I was employed by the California Energy Commission for five years and served as an Energy Commission Specialist Supervisor II in the Research, Demonstration and Development Division. I also was employed by Silicon Crystals for eight years and served as the Director of Operations and Sales. In my experience at the CPUC in the ORA Communications and Water Policy Branch I have provided expert witness in three general rate cases (GRC) including the 2014 Cal Water GRC, and 2013 and 2016 San Jose Water Company GRCs. I was also the lead analyst on the Balance Rate Rulemaking R.11-11-008 and Digital Infrastructure Video Competition Act Franchise Renewal Rulemaking R.13-05-007.

Q.5 What is your responsibility in this proceeding?
A.5 I am responsible for providing testimony in response to OII.15-11-007 IR 9 which asks “Please describe the extent to which wireless and wireline services are substitutes for one another, or separate market, based on you experience and on such evidence and
documentation that you can apply” and IR 9a. which asks “Are there barriers to such substitution, and what are the limits of such substitution?”

Q.6 Does that conclude your testimony?

A.6 Yes, at this time.
ATTACHMENT B

Fixed Wireless (top) and Fixed Wireline (bottom) Availability in Northern California

17 www.broadbandmap.ca.gov
18 “Served” means speeds equal to 6 Mbps download and 1.5 Mbps upload. “Partially Served” is the same as served but access is limited to fixed wireless customers with line of site. “Underserved” area is where broadband is available, but no wireline or wireless facilities-based provider offers service at advertised speeds of at least 6 mbps download and 1.5 mbps upload. “Unserved” area is an area that is not served by any form of wireline or wireless facilities-based broadband, such that Internet connectivity is available only through dial up service.
Fixed Wireless (top) and Fixed Wireline (bottom) Availability in Southern California.¹²

“Served” means speeds equal to 6 Mbps download and 1.5 Mbps upload. “Partially Served” is the same as served but access is limited to fixed wireless customers with line of site. “Underserved” area is where broadband is available, but no wireline or wireless facilities-based provider offers service at advertised speeds of at least 6 mbps download and 1.5 mbps upload. “Unserved” area is an area that is not served by any form of wireline or wireless facilities-based broadband, such that Internet connectivity is available only through dial up service.
# ATTACHMENT D

## Known Fixed Wireless Broadband Service Providers in California

<table>
<thead>
<tr>
<th>No.</th>
<th>Provider Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>101 Netlink*</td>
</tr>
<tr>
<td>2.</td>
<td>Access Port/CDS Enterprises*</td>
</tr>
<tr>
<td>3.</td>
<td>AeroSurf</td>
</tr>
<tr>
<td>4.</td>
<td>AFES Network Services LLC</td>
</tr>
<tr>
<td>5.</td>
<td>Aircloud Communications</td>
</tr>
<tr>
<td>6.</td>
<td>Cal.net (Merged w/ Central Valley Broadband)</td>
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<tr>
<td>7.</td>
<td>California Broadband Services</td>
</tr>
<tr>
<td>8.</td>
<td>CALTEL Connections (Combined w/ Calaveras Internet)</td>
</tr>
<tr>
<td>9.</td>
<td>Com-Pair</td>
</tr>
<tr>
<td>10.</td>
<td>Conifer Communication, Inc</td>
</tr>
<tr>
<td>11.</td>
<td>Cybernet Communications*</td>
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<tr>
<td>12.</td>
<td>DigitalDune*</td>
</tr>
<tr>
<td>14.</td>
<td>DM-TECH</td>
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<tr>
<td>15.</td>
<td>Etheric Networks Inc.</td>
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<tr>
<td>16.</td>
<td>ExWire*</td>
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<tr>
<td>17.</td>
<td>Fire2Wire</td>
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<tr>
<td>18.</td>
<td>Frazier Mountain Internet</td>
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<td>19.</td>
<td>Internet Free Planet</td>
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<tr>
<td>20.</td>
<td>IWWISP*</td>
</tr>
<tr>
<td>22.</td>
<td>Mother Lode Internet*</td>
</tr>
<tr>
<td>23.</td>
<td>Nitelog Inc. (DBA Redshift Internet Communications)</td>
</tr>
<tr>
<td>24.</td>
<td>North Coast Internet*</td>
</tr>
<tr>
<td>25.</td>
<td>OACYS Technology</td>
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<tr>
<td>26.</td>
<td>Outback Internet</td>
</tr>
<tr>
<td>27.</td>
<td>Pinnacles Telephone Co.</td>
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<tr>
<td>28.</td>
<td>Plumas Sierra</td>
</tr>
<tr>
<td>29.</td>
<td>Ruralnet Wireless LLC</td>
</tr>
<tr>
<td>30.</td>
<td>SBC-Wireless</td>
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<tr>
<td>31.</td>
<td>Sebastian/Kerman</td>
</tr>
<tr>
<td>32.</td>
<td>SkyRiver Communications*</td>
</tr>
<tr>
<td>33.</td>
<td>SmarterBroadband, Inc.</td>
</tr>
<tr>
<td>34.</td>
<td>Softcom Internet Communications, Inc.</td>
</tr>
<tr>
<td>35.</td>
<td>South Valley Internet*</td>
</tr>
<tr>
<td>36.</td>
<td>Succeed.net</td>
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<tr>
<td>37.</td>
<td>Surfnet Communications</td>
</tr>
<tr>
<td>38.</td>
<td>Tekify Broadband*</td>
</tr>
<tr>
<td>39.</td>
<td>Throck</td>
</tr>
<tr>
<td>40.</td>
<td>Tsunami-Wireless*</td>
</tr>
<tr>
<td>41.</td>
<td>unWired Broadband, Inc.</td>
</tr>
<tr>
<td>42.</td>
<td>USA Communications/Antilles Wireless*</td>
</tr>
<tr>
<td>43.</td>
<td>Valley Internet</td>
</tr>
<tr>
<td>44.</td>
<td>Velocity Communications, Inc.</td>
</tr>
<tr>
<td>45.</td>
<td>Vista*</td>
</tr>
<tr>
<td>46.</td>
<td>Volcano Communications Group</td>
</tr>
<tr>
<td>47.</td>
<td>Winters Broadband LLC</td>
</tr>
</tbody>
</table>

* Provider pricing and/or speeds not available