Before the
CALIFORNIA PUBLIC UTILITIES COMMISSION

Order Instituting Investigation into the State of Competition Among Telecommunications Providers in California, and to Consider and Resolve Questions raised in the Limited Rehearing of Decision 08-09-042.	Investigation 15-11-007

Direct Testimony

of

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on behalf of the

Office of Ratepayer Advocates
of the
California Public Utilities Commission

June 1, 2016

REDACTED FOR PUBLIC INSPECTION

DIRECT TESTIMONY OF LEE L. SELWYN

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DIRECT TESTIMONY OF LEE L. SELWYN
ON BEHALF OF ORA

EXECUTIVE SUMMARY

Introduction

In its November 5, 2015 Order initiating the current investigation, the California Public Utilities Commission ("CPUC" or "Commission") explained that when in 2006 it issued its first decision in the Uniform Regulatory Framework docket, it had "sought to foster an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market. The Commission explains that it had "anticipated that competition among telecommunications carriers would drive increased innovation and improved customer service, while at the same time keeping prices just and reasonable," but also "noted at the time an ongoing need and statutory mandate for vigilant Commission oversight of the competitive marketplace to ensure that the market serves consumers well."

Respondent wireline voice and broadband service providers have furnished a substantial body of data that, along with various other data sources, compels the conclusion that competition among telecommunications providers in California has been minimal and that it has not resulted in "improved customer service" or in "prices [that are] just and reasonable." In the decade since the first URF decision was issued and most intrastate wireline services were detariffed or deregulated outright, the wireline telecommunications market has remained highly concentrated and continues to be dominated by one, or at most two, providers in every geographic market in the State.

There have indeed been significant changes in the telecommunications landscape. The nation's cable television providers have been far more successful than the ILECs in adapting their wireline distribution infrastructure to support high-speed broadband. As a result, they have become the dominant "last mile" provider, overtaking the ILECs in serving households that want high-speed broadband access in addition to voice telephone service. At the end of the day, however, the result has been simply to replace one dominant provider – the ILEC – with a new dominant provider – the cable company, or at best to retain both as splitting the market for voice/broadband services. One key result of this ongoing condition has been a succession of price increases for both voice and broadband services that have far exceeded economywide inflation rates. Thus, while the players may have changed, the level of market concentration and market dominance has remained largely intact over the period since URF.

To be sure, Internet and IP technology have created enormous opportunities for new entrants at the "application" layer (as distinct from the physical, network or transport layers), but much of that activity is utterly dependent upon gaining access to fixed broadband subscribers. But in opposing "net neutrality" and in seeking to overturn the FCC's *Open Internet Order*, the

incumbent LECs and incumbent cable MSOs have demonstrated their intent to exploit their market power with respect to residential broadband to the maximum extent possible.

While Respondents to this OII insist that the overall telecommunications market is effectively competitive and that "intermodal" competition, such as that posed by wireless voice and broadband services, is constraining prices and the incumbent providers' exercise of market power, the factual evidence adduced in this proceeding belies all such claims. Following is a summary of the principal conclusions that I present based upon this evidence.

Voice Services

- Traditional local exchange carriers continue to maintain overwhelming dominance of circuit-switched voice connections; controlling some 88.6% of the nationwide voice market, including both direct retail connections and indirect wholesale services furnished to other providers for sale at retail or for incorporation into their own retail circuit-switched offerings.

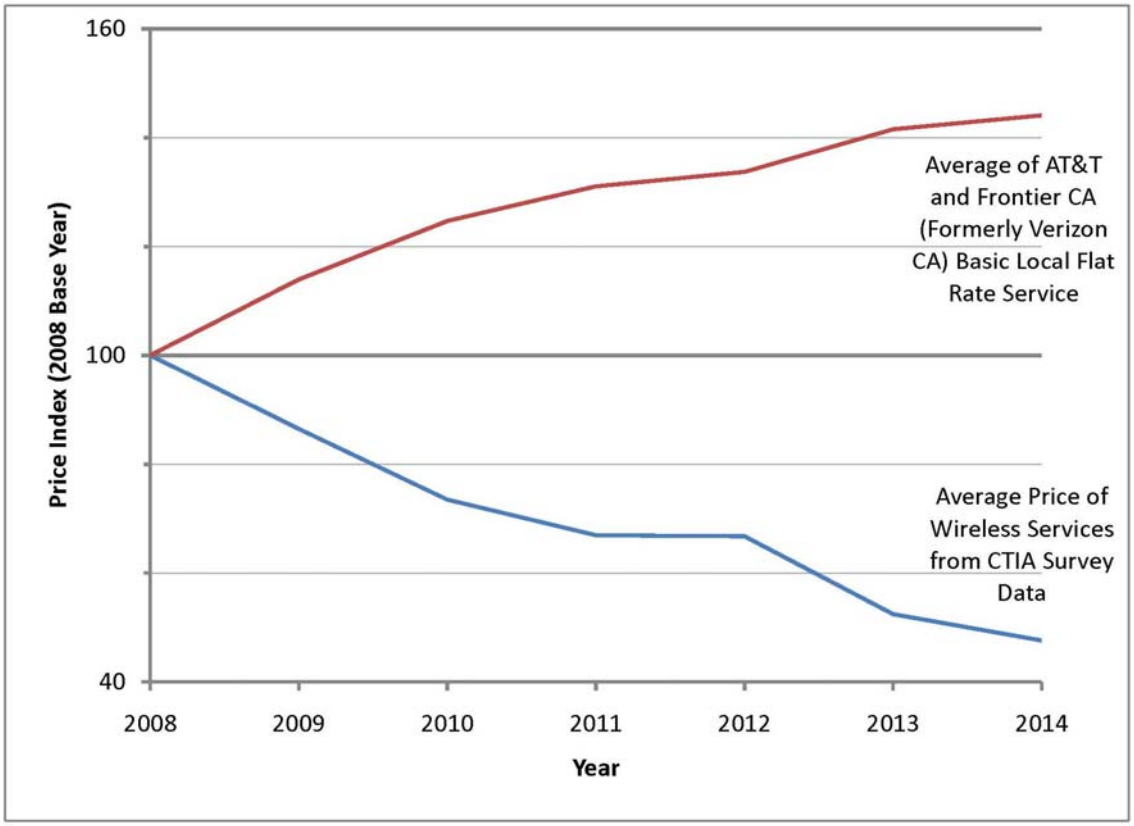
- The vast majority – some 92.5% nationally and 87.4% in California – of all residential and business Voice over Internet Protocol (VoIP) connections are being provided by facilities-based wireline carriers – traditional Incumbent Local Exchange Carriers and Cable MSOs that are also the dominant providers of high-speed (25 Mbps up, 3 Mbps down or greater) broadband access.

- The principal competitor to traditional wireline voice service is VoIP, but the use of VoIP requires that the customer have a broadband connection with sufficient bandwidth and reliability. The dominant broadband providers – ILECs and cable MSOs – are also the dominant voice providers, and are thus able to use their control of broadband to limit or otherwise manage customer migration to competing VoIP services. As a result, and after more than a decade in existence, these "over-the-top" VoIP services have captured only about 7.5% of the national and 12.6% of the California residential wireline voice market.

- Although for many consumers mobile wireless voice service may be a substitute for fixed wireline voice telephone service, nearly two-thirds of households that have wireless phones have chosen to retain their wireline service in order to obtain reliable access to 911, for residential alarm service, medical monitoring, and for other purposes they deem important.

- There is compelling evidence as to the lack of any effective competitive challenge to legacy wireline voice telephone service. Basic wireline local telephone service prices have increased by more than 40% since being detariffed in 2008, during a period when wireless prices have been cut in half. Wireline "bundles" of unlimited local and long distance calling and service features that have become standard in virtually every postpaid and many prepaid wireless rate plans are nearly double the price for similar wireless bundles, and do not include other standard wireless features such as texting and Internet access. If wireless were

an actual competitor to wireline, these wireline price levels would be unsustainable; that they persist belies any claim that wireless is a substitute for wireline voice service.



Broadband

- The relevant product market for analysis in this OII is residential broadband Internet access at speeds of at least 25 Mbps download and 3 Mbps upload – i.e., the current FCC definition of "advanced telecommunications services."

- The relevant geographic market for wireline residential broadband access is at the census block level. For convenience, broadband market data can be summarized over larger geographic areas, such as counties or Metropolitan Statistical Areas (MSAs), to assess the extent of broadband availability and the extent that consumers have a choice of service provider.

- There is a lack of competition and consumer choice for broadband services at speeds of 25/3. Close to 70% of households in California have only one broadband provider; and only 24% have a choice of two providers. Even in the most densely populated MSA counties, the results are similar: 69% of households can obtain 25/3 broadband from only one unregulated monopoly provider, and only about 25% have a choice of two or more providers at 25/3.

- Two separate Market Share and Market Concentration (HHI) analyses were undertaken based upon broadband availability and actual broadband subscriptions. In every county in California, the HHI in both of these categories is in excess of the 2500, indicating the existence of a "highly concentrated" market as defined by the US Department of Justice.

- Even where more than one provider nominally offers broadband service in a particular census block, the market may still be dominated by only one principal firm. Using a Market Dominance Index ("MDI") newly developed for this purpose, there is a clear pattern of extreme dominance by a single broadband provider in virtually every county statewide.

- Consistent with the lack of competition and the extreme market power being exercised by the unregulated dominant broadband providers statewide, residential broadband prices have increased by an average of 28.6% since the first URF decision was issued in 2006.

- The unavailability of wholesale last-mile broadband access at reasonable rates for use by competitors in serving residential customers limits competition and competitive availability of broadband. Availability of wireless services on a wholesale basis has fostered disruptive competition and contributed to lower wireless price levels overall. The Commission should consider measures that would expand the availability of wholesale broadband services so as to help bring retail prices down to more competitive levels.

Policy recommendations to address insufficient competition

The detailed analysis of the extensive data amassed in this Investigation compels the conclusion that the Commission's goal in adopting the URF – "to foster an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market – has not been achieved. A decade of experience under the current regulatory regime demonstrates that it is simply unrealistic to apply the same "uniform" regulatory treatment to dominant incumbent providers and to nascent and fringe competitors. The massive capital investments needed to achieve a ubiquitous telecommunications facilities infrastructure require a Minimum Efficient Scale (MES) of operations that is incapable of supporting more than one or, at most, two providers. Indeed, the recent spate of large telecom mergers has been supported by claims of even greater efficiencies expected to result from further increases in the scale of the post-merger entity. The elapse of time will not alter this condition, and regulatory policy must finally be modified to recognize this reality.

- The Commission should consider replacing the"uniform" regulatory framework with separate regulatory treatement for dominant providers and for nondominant entrants and other onthe competitive fringe. The policy should also recognize the potential for a firm's status (dominant vs. nondominant) to change over time, and respond accordingly.

With respect to firms deemed as "dominant," the Commission could consider an escalation of potential regulatory measures that can be implemented in succession to the extent that the earlier strategies fail to achieve the overarching goal of achieving "an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market. Some of these measures could include:

- Imposing and enforcing specific performance targets addressing service quality, time to repair, customer service, and related issues, and impose monetary penalties for failure to comply.

- Imposing and enforcing specific service availability targets, and impose monetary penalties for failure to achieve them.

- Reintroducing some form of price and earnings regulation. Currently, the FCC is looking into price-cap regulation for Business Data Services.

- Considering potential adoption of specific structural remedies, such as separation of wholesale and retail services along the lines adopted by Ofcom in the UK.

- Considering the possibility pursuit of a public broadband infrastructure initiatives such as the establishment of a public wholesale broadband network under construction in Australia.

The reality that has been revealed by the data and analysis produced in the Investigation is that dominant and non-dominant firms should not be afforded "uniform" regulatory treatment, and that a new and creative approach to constraining the market power of the dominant voice and broadband providers is essential to protect consumers and the continued viability of such competition as can efficiently exist adjacent to the dominant service providers.

INTRODUCTION AND SUMMARY

Introduction

1. I am the same Lee L. Selwyn who submitted testimony in this matter on March 15, 2016 addressing OII Questions 20 and 21, and an initial response to Question 22 in the November 5, 2015 Order Instituting Investigation ("OII").

2. The purpose of this testimony is to provide economic analysis in support of ORA's responses to Information Requests 9, 10, 11, 12 and 23 of the OII as further clarified by the Administrative Law Judge's Ruling dated February 4, 2016,[1] as well as to address and comment upon the March 15, 2016 responses of other parties to OII Information Requests 20-22. Other ORA witnesses are also addressing these and other Information Requests as well as providing ORA's responses to submissions by Respondents.

3. The specific Information Requests ("IRs") to which this testimony responds are as follows:

> 9. Please describe the extent to which wireless and wireline services are substitutes for one another, or separate markets, based on your experience and on such evidence and documentation that you can supply.
>
> a. Are there barriers to such substitution, and what are the limits of such substitution?

1. *Ruling on Pending Motions and Issues Discussed at January 20, 2016 Prehearing Conference*, issued February 4, 2016.

10. How and to what extent do competition and consumer choices vary by geographic market in California?

11. How and to what extent is competition in the business market different from that in the residential market?

12. How much competition is there for advanced telecommunications services at the new national standard of 25 Mbps down (and 3 Mbps up)?

22. (To the extent not fully responded to in my March 15, 2016 testimony). What information does the Commission need to collect going forward, in order to timely monitor whether (a) the telecommunications market is operating efficiently, and (b) the rates for telephone services are just and reasonable? How should the Commission collect and use that information, and report on it to the Legislature and ratepayers? Please provide specific data and analysis to support your conclusion.

23. If you have identified any market failures, inefficiencies or bottlenecks in your answers to the questions above, please suggest rules, regulations or policies that would ameliorate those market problems.

    a. What initiatives can this Commission take to enhance competition within California, and what measures are uniquely within the province and jurisdiction of federal regulatory authorities?

Summary

4. In its November 5, 2015 Order initiating the current investigation, the California Public Utilities Commission ("CPUC" or "Commission") explained that when in 2006 it issued its first decision in the Uniform Regulatory Framework docket, it had "sought to foster an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market. The Commission explains that it had "anticipated that competition among telecommunications carriers would drive increased innovation and improved customer service, while at the same time

keeping prices just and reasonable," but also "noted at the time an ongoing need and statutory mandate for vigilant Commission oversight of the competitive marketplace to ensure that the market serves consumers well."[2]

5. Respondent wireline voice and broadband service providers have furnished a substantial body of data that, along with various other data sources, compels the conclusion that competition among telecommunications providers in California has been minimal and that it has not resulted in "improved customer service" or in "prices [that are] just and reasonable." In the decade since the first URF decision was issued and most intrastate wireline services were detariffed or deregulated outright, the wireline telecommunications market has remained highly concentrated and continues to be dominated by one, or at most two, providers in every geographic market in the State.

6. There have indeed been significant changes in the telecommunications landscape since the adoption of URF. The nation's cable television providers have been far more successful than the ILECs in adapting their wireline distribution infrastructure to support high-speed broadband. As a result, they have become the dominant "last mile" provider, overtaking the ILECs in serving households that want high-speed broadband access in addition to voice telephone service. At the end of the day, however, the result has been simply to replace one dominant provider – the ILEC – with a new dominant provider – the cable company, or at best to retain both as splitting the market for voice/broadband services. One key result of this ongoing

2. *OII*, at 1.

condition has been a succession of price increases for both voice and broadband services that have far exceeded economywide inflation rates. Thus, while the players may have changed, the level of market concentration and market dominance has remained largely intact over the period since URF.

7. To be sure, Internet and IP technology have created enormous opportunities for new entrants at the "application" layer (as distinct from the physical, network or transport layers), but much of that activity is utterly dependent upon gaining access to fixed broadband subscribers. But in opposing "net neutrality" and in seeking to overturn the FCC's *Open Internet Order*, the incumbent LECs and incumbent cable MSOs have demonstrated their intent to exploit their market power with respect to residential broadband to the maximum extent possible.

8. While Respondents to this OII insist that the overall telecommunications market is effectively competitive and that "intermodal" competition, such as that posed by wireless voice and broadband services, is constraining prices and the incumbent providers' exercise of market power, the factual evidence adduced in this proceeding belies all such claims. Following is a summary of the principal conclusions that I present based upon this evidence.

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- Even where more than one provider nominally offers broadband service in a particular census block, the market may still be dominated by only one principal firm. Using a Market Dominance Index ("MDI") newly developed for this purpose, there is a clear pattern of extreme dominance by a single broadband provider in virtually every county statewide.

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- The unavailability of wholesale last-mile broadband access at reasonable rates for use by competitors in serving residential customers limits competition and competitive availability of broadband. Availability of wireless services on a wholesale basis has fostered disruptive competition and contributed to lower wireless price levels overall. The Commission should consider measures that would expand the availability of wholesale broadband services so as to help bring retail prices down to more competitive levels.

Policy recommendations to address insufficient competition

9. The detailed analysis of the extensive data amassed in this Investigation compels the conclusion that the Commission's goal in adopting the Uniform Regulatory Framework – "to foster an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market – has not been achieved. A decade of experience under the current regulatory regime demonstrates that it is simply unrealistic to apply the same "uniform" regulatory treatment to dominant incumbent providers and to nascent and fringe competitors. The massive capital investments needed to achieve a ubiquitous telecommunications facilities infrastructure require a Minimum Efficient Scale (MES) of operations that is incapable of supporting more than one or, at most, two providers. Indeed, the recent spate of large telecom mergers has been supported by claims of even greater efficiencies expected to result from further increases if the scale of the post-merger entity. The elapse of time will not alter this condition, and regulatory policy must finally be modified to recognize this reality.

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(1) Imposing and enforcing specific performance targets addressing service quality, time to repair, customer service, and related issues, and impose monetary penalties for failure to comply.

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(3) Reintroducing some form of price and earnings regulation. Currently, the FCC is looking into price-cap regulation for Business Data Services.

(4) Considering potential adoption of specific structural remedies, such as separation of wholesale and retail services along the lines adopted by Ofcom in the UK.

(5) Considering the possibility pursuit of a public broadband infrastructure initiatives such as the establishment of a public wholesale broadband network under construction in Australia.

The reality that has been revealed by the data and analysis produced in the Investigation is that dominant and non-dominant firms should not be afforded "uniform" regulatory treatment, and that a new and creative approach to constraining the market power of the dominant voice and broadband providers is essential to protect consumers and the continued viability of such competition as can efficiently exist adjacent to the dominant service providers.

Background

10. Before proceeding to address the IRs identified above, my responses to which will involve application of the more robust analytical framework that I had proposed in my March 15 testimony, I will first address the Respondents' positions on the framework the Commission should utilize in assessing competition, as well as Respondents' ongoing position as to the limitation of this proceeding to legacy *wireline voice* services. I will also respond to IR 10

insofar as it concerns the Respondents' overall contention that the wireline voice market is currently subject to effective competition.

11. In my March 15, 2016 testimony, I responded to OII Information Requests 20 and 21 by proposing an analytical framework that the Commission can use to objectively assess the effectiveness of competition in both the retail and wholesale telecommunications markets. As I noted in response to Information Request no. 21, determining whether the prices of telephone services are just and reasonable is a key element of that framework. The Commission can apply the framework described in my March 15 testimony to monitor whether the telecommunications market is operating efficiently and to determine if rates for services are just and reasonable. Ultimately, the Commission will want to hear and consider a range of policy options to protect consumers. It will want the ability to assure that, in those sectors in which competition is not economically feasible, essential services are available at cost-based prices, both at retail to end-user consumers as well as at wholesale for use as inputs to services that are capable of supporting competition.

12. In their March 15, 2016 submissions, industry Respondents offered minimal discussions on the issue raised in Information Requests 20-22. These respondents argued that any attempt to assess or reinstate any regulation of telecommunications services in California must be narrowly confined to legacy circuit-switched and non-IP services subject to the Commission's jurisdiction. They contended that IP-based voice services (VoIP) and broadband fall outside the scope of the Commission's jurisdiction, and thus must be excluded from this Investigation. For example,

Comcast's John Gutierrez, Senior Director, Government Affairs at Comcast in Livermore, California introduces his response to IR 20 by stating that "[b]ased on the context of this proceeding, my understanding is that the 'retail and wholesale markets' referred to [in the OII] are markets for voice telecommunications services."[3] Charter Communications' Betty J. Sanders, Senior Director Regulatory Affairs, summarizes the company's position as follows: "The stated purpose of the Commission's review in this proceeding is to determine the scope of competition for regulated retail voice services in the State. Charter Fiberlink believes that evidence of retail line loss by ILECs provides ample evidence that the retail voice market in California is highly competitive both from an empirical and customer perception perspective."[4] The only Respondent testimony on this subject was offered by a AT&T's economist, Dr. Michael Katz. Dr. Katz similarly argued that the scope of the proceeding should be limited to wireline voice services, and suggested that "the Commission's past determination that rates are just and reasonable if they are the result of effective competition is an economically sound one". Furthermore, he states "that, if the Commission decides to revisit its past determination that California's wireline voice services are subject to effective competition, then the Commission should focus on whether consumers have meaningful choices, rather than relying on mechanistic measures of concentration or profits."[5] AT&T's proposed analytical frame is, to say the least, overly simplistic, although hardly surprising: Any "mechanistic measures of concentration or

3. Gutierrez (Comcast), March 15, 2016 submission, at 2.

4. Sanders (Charter), March 15, 2016 submission, at 6.

5. Katz (AT&T), March 15, 2016 submission, at 3.

profits" likely have the potential to *disprove* Dr. Katz's conclusions as to the existence of effective competition and just and reasonable rates in the California wireline voice market.

The scope of this proceeding must include both voice and broadband services.

The voice market does not satisfy the requirements for an "effectively competitive" market

13. Despite the fact that the OII IRs 2, 3, 4, 6, 7 and 14 expressly address broadband services, and several other IRs, including 20 and 23, implicitly include broadband services within their scope, the Independent Local Exchange Carrier (ILEC) and cable Multiple System Operator (MSO) Respondents' March 15 submissions' recurring theme is that the scope of the CPUC's jurisdiction is largely confined to wireline voice telephone service, that wireline voice telephone service is effectively competitive and that, as such, no reinstatement of pre-URF regulatory constraints is appropriate or required. For example, Dr. Katz states that:

> For example, the share of U.S. households with only wireless telephone service has more than doubled since 2008, so that by June 2015, 55 percent of children and 47 percent of adults lived in wireless-only households. And SNL Kagan estimates that, at the national level, the number of subscribers to voice services provided by cable system operators increased by approximately 44 percent from 2008 to 2015. Similarly, the FCC's Local Telephone Competition Report finds that the share of switched access lines and voice over Internet Protocol (VoIP) subscriptions in California accounted for by non-ILECs increased from 22 percent to 39 percent between December 2008 and December 2013.[6]

While I do not offer a legal opinion as to the jurisdictional arguments regarding non-voice and particularly broadband services, from a preliminary review of those same FCC *Local Compe-*

6. Katz (AT&T), at A.20, citations omitted.

tition Reports and other FCC reports dealing with the local wireline voice and broadband markets as well as those dealing with wireless, it appears that Dr. Katz may be overstating the competitive condition in the voice market. At a minimum, he is ignoring the extent to which competing wireline voice services are themselves utterly dependent upon the broadband market and thus the ongoing importance of *broadband* competition to potential local voice service competitors. A broadband connection is required for any VoIP service, fixed or nomadic.

14. The FCC's most recently released *Voice Telephone Services Report* (as of December 2014) provides nationwide data on "Wireline Retail Local Telephone Service Connections by Technology and Customer Type."[7] According to the *Report*, nationwide, as of December 31, 2014, there were 70.23-million total residential wireline connections, of which 32.0-million consisted of traditional switched access lines, and the remaining 38.23-million were being provided by "interconnected VoIP." The breakdown of the 70.23-million residential wireline connections between ILEC and non-ILEC providers was given as 39.4-million ILEC, and 30.8-million non-ILEC.[8] The *Voice Services Report* also provides a breakdown of ILEC and non-ILEC services by technology:

7. FCC, Industry Analysis and Technology Division, Wireline Competition Bureau, *Voice Telephone Services: Status as of December 31, 2014*, rel. March 2016 ("*Voice Services Report*"), at 3, Figure 2.

8. *Id.*

Table 1

NATIONWIDE RETAIL WIRELINE VOICE SERVICES BY TECHNOLOGY AND TYPE OF PROVIDER
Retail Residential Connections (000's)

	Switched access lines	Interconnected VoIP	Total
ILEC	29,937	9,496	39,433
Non-ILEC	2,063	28,738	30,800
Total	32,000	38,234	70,233

Source: FCC Voice Services Report as of December 2014, at 3, Figure 2.

Corresponding data is also provided for California, as summarized on Table 2 below:

Table 2

CALIFORNIA RETAIL WIRELINE VOICE SERVICES BY TECHNOLOGY AND TYPE OF PROVIDER
Retail Residential Connections (000's)

	Switched access lines	Interconnected VoIP	Total
ILEC	4,682	1,374	6,056
Non-ILEC	3,374	3,071	6,445
Total	8,056	4,445	12,501

Source: FCC Voice Services State-Level data as of December 2014 (excel file), available at https://www.fcc.gov/voice-telephone-services-report

To better understand the extent to which "competition" is actually present in the wireline residential voice market, it is instructive to drill down into these individual numbers. Unfortunately, the *Local Competition Report* does not provide residential/nonresidential breakdowns in some of these areas, so it is necessary first to look at the total nationwide retail wireline voice market:

Table 3

UNDERLYING SOURCES OF WIRELINE SERVICES
Total Retail Connections (000's)

	Switched access lines	Interconnected VoIP	Total
ILEC	58,045	11,336	69,382
Non-ILEC	14,560	42,902	57,462
Total	72,605	54,238	126,844

Source: FCC Voice Services Report as of December 2014, at 3, Figure 2.

Begin by examining the roughly 19.2-million of non-ILEC switched access lines that are given in the *Report*. According to Figure 8 in the *Local Competition Report*, ILECs reported that they provided a total of 14.25-million wholesale services to CLECs, consisting of resold lines, UNE-Ps and UNE-Ls. CLECs reported using a much smaller number of ILEC wholesale services, 6.54-million. The *Report* offers some explanation for the disparity in ILEC vs. CLEC reporting, but these "explanations" do not appear to account for the large differences. Table 4 below provides relative shares of ILEC- and CLEC-provisioned switched access services (irrespective of the retail provider):

Table 4

THE ULTIMATE SOURCE OF UNDERLYING SWITCHED ACCESS RETAIL CONNECTIONS NATIONWIDE – AS OF DECEMBER 31, 2014 (000's)

	Switched Access Lines	Shares (%)
Total Switched Access Lines	72,605	100.00%
ILEC Retail lines	58,045	
ILEC UNE-L provisioned for CLECs	2,516	
ILEC Wholesale Lines for Resale	3,750	
Total ILEC Switched Access Lines	64,311	88.58%
CLEC-Owned Switched Access Lines	8,294	11.42%

Source: FCC Industry Analysis and Technology Division, Wireline Competition Bureau, *Voice Telephone Services Status as of December 31, 2014*, at Figure 2, Table 1.

Thus, natonwide, the ILEC share of underlying switched access services is 88.58%, confirming that the ILECs still maintain overwhelming dominance of the underlying service, either via direct sales retail or via wholesale transactions for ultimate retail sale by CLECs.

15. A corresponding analysis can be undertaken with respect to Interconnected VoIP services. "Interconnected VoIP" service refers to connections that provide access to and from the Public Switched Network ("PSN," sometimes referred to as the Public Switched Telephone Network ("PSTN")). There are two types of Interconnected VoIP services, generally referred to as "Fixed VoIP" and "Nomadic VoIP." Fixed VoIP is provided by a broadband provider such as a cable MSO or an ILEC over the same physical facility that is used to furnish the customer's broadband Internet access services. Fixed VoIP services are typically provisioned utilizing a

dedicated IP channel that is physically provided over the same "last mile" facility that is used to furnish the customer's broadband Internet access services, while being *logically* separated into a separate channel or data stream from the broadband channel that is used for access to the public Internet. Nomadic VoIP, sometimes referred to as "over-the-top" ("OTT") VoIP, is offered as a user-level Internet application that operates over the customer's broadband Internet access service. Vonage, Skype, and Google Voice are examples of Nomadic VoIP services. The term "Nomadic" is used because the service is not confined to a specific geographic location. The Vonage interface device, for example, can be connected to any Internet access point worldwide and provides the subscriber with the same service, same PSN telephone number, and connectivity that would be available over a comparable broadband connection at the user's home or office. Other types of over-the-top or nomadic VoIP services include so-called "SIP" (for "Session Initiation Protocol") services used by many small and large businesses as cloud-based "virtual PBX" services or for virtual PBX trunks that are connected to a "soft switch" on the customer's premises. RingCentral, Shoretel, and Grasshopper are examples of cloud-based virtual "Hosted PBX" providers.

16. The FCC's *Voice Telephone Services Report* distinguishes among three categories of VoIP services – ILEC Fixed VoIP, Non-ILEC Fixed VoIP, and Over-the-Top Nomadic VoIP – separately for residential and business services. Table 5 below summarizes this data for residential VoIP services on both a nationwide basis and specificaly for California.

Table 5

RESIDENTIAL VoIP SERVICE PROVIDER SHARES NATIONWIDE AND CALIFORNIA – AS OF DECEMBER 31, 2014 (000's)

	Nationwide		California	
	VoIP Subscriptions	Shares (%)	VoIP Subscriptions	Shares (%)
Total VoIP Service Units	38,234	100.00%	4,445	100.00%
ILEC-provided Fixed VoIP	9,468	24.76%	1,371	30.84%
Non-ILEC-provided Fixed VoIP	25,883	67.70%	2,514	56.56%
Over-the-top Nomadic VoIP	2,881	7.54%	560	12.60%

Source: FCC Industry Analysis and Technology Division, Wireline Competition Bureau, *Voice Telephone Services Status as of December 31, 2014*, at Figure 2, Table 1, and Supplemental Table 1 (California).

Of the 38.2-million total nationwide residential VoIP connections (as of December 2014), only 2.9-million, or about 7.5%, were "nomadic;" the bulk of these services – 94.5% – were provided either by an incumbent LEC or (primarily) by an incumbent cable broadband provider. California had a somewhat higher percentage of nomadic VoIP subscriptions – 12.6% – but 87.4% were provided by one of the incumbent LEC or cable broadband providers. Looking at the voice market as a whole – i.e., switched access lines and VoIP combined – some 94.22% of all residential wireline voice services nationwide are still being furnished by a dominant incumbent provider – either the ILEC or the incumbent cable MSO (see Table 6):

Table 6

RESIDENTIAL VOICE SERVICE PROVIDER SHARES NATIONWIDE – AS OF DECEMBER 31, 2014 (000's)

	Switched Access	VoIP Subscriptions	Total	Shares (%)
Dominant Incumbent carrier	30,825	35,353	66,178	94.22%
CLEC or OTT VoIP provider	1,175	2,881	4,056	5.78%
Total	32,000	38,234	70,234	100.00%

Source: Tables 4 and 5. Assumes (conservatively) that proportion of total CLEC retail switched access lines that are CLEC-owned is same for residential market as for total CLEC services.

Despite the introduction of nomadic over-the-top VoIP services, the overwhelming majority – more than 94% – of all wireline residential voice services nationwide are still being provided by one of the two principal dominant incumbents – the ILEC or the cable MSO.[9] With the exception of large commercial buildings in central business districts of major cities, facilities-based services are still largely confined to the incumbent LEC and the incumbent MSO, such that non-ILEC or non-cable providers are not a viable alternative to the dominant carriers in the vast majority of situations.[10]

9. Table 4 provides a breakdown of CLEC-provided retail switched access lines as between ILEC-provisioned (UNE-L or resale lines) and CLEC-owned lines. There is no corresopnding breakdown for the residential market only. For purposes of the analysis presented in Table 6, I have applied the same CLEC-owned and ILEC-provisioned percentages given for all CLEC-provided services to the residential market only. This is a highly conservative assumption, since the percentage of CLEC-owned switched access lines used to serve residential customers is likely less than that for all CLEC switched access services.

10. The FCC's *Voice Telephone Services Report* as of December 2014 gives the total number of California residential voice subscriptions, including ILEC and CLEC switched access lines, and fixed and over-the-top VoIP lines, at 8.05-million. Respondents' voice subscription figures provided in response to IR 5 total 6.85-million as of December 2015. The difference between the FCC's figure and the sun of those provided by Respondents is likely due to (a) the different dates (i.e., December 2014 for the FCC and December 2015 for the IR 5 responses), and (b) the possibility that certain smaller switched access and/or VoIP providers in California were not included among the

(continued...)

17. In its May 2, 2016 Investigative Order addressing competition for Business Data Services ("*Business Data Services Order*"), the FCC notes that:

> Unlike incumbent LECs and cable providers, non-cable operators typically do not ubiquitously deploy connections to locations in a local geographic area but instead target deployment in dense urban areas in response to significant business demand for Business Data Services. Non-cable competitive LECs lack the necessary budgets and economies of scale to viably overbuild and connect all businesses in an area with their own facilities in the hopes of attracting sales. They instead invest in transport within a local area based on potential demand and then rely on a mix of facility-based deployments and leased lines to connect end-user locations to their network facilities.[11]

Larger business and enterprise customers can often obtain their VoIP services from an interexchange carrier and/or a competitive access provider (the two are often integrated, such as Level 3). In the residential market, however, most fixed VoIP services are provided either by an ILEC or a cable MSO, and any non-cable CLEC will generally be reliant upon the ILEC for the facilities needed to access residential and small business customer. Absent any effective competition from multiple providers for the underlying broadband service, VoIP and other services that are dependent upon the customer's having broadband access have no independent competitive existence in the voice market. Unfortunately, no residential/business breakdown for nomadic VoIP subscriptions is provided.

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10. (...continued)
Respondents identified in the OII.

11. FCC, *Business Data Services in an Internet Protocol Environment*, WC Docket No. 16-143 *et al*, *Tariff Investigation Order and Further Notice of Proposed Rulemaking*, rel. May 2, 2016, FCC 16-54 ("*Business Data Services Order*"), at para. 54, citations omitted.

18. The *Local Competition Report* provides some state-level data, although here too there is no specific breakdown as between nomadic and non-nomadic VoIP. Total residential wireline voice connections in California are given at 8.61-million,[12] representing about 68.3% of the 12.62-million California households.[13] Of these, about 4.13-million out of the 8.61-million are using some type of interconnected VOIP. However, only 591,000 are identified as "Standalone non-ILEC" VoIP subscribers. This group would include both nomadic VoIP subscribers as well as those who get their voice service from a cable MSO but who do not also get broadband Internet access from the same provider for example, customers of "double-play" bundles of voice and video.

19. Irrespective of the type of VoIP service that might be available to any given residential customer, all require that the customer subscribe to some service being offered by a broadband access provider either an ILEC or a cable MSO. FCC data confirm that the vast majority of VoIP services are actually being furnished by one of the two broadband providers (ILEC or MSO), and for the small percentage of VoIP customers who purchase an over-the-top type of service, the customer will still be dependent upon same ILEC or MSO for the underlying broadband access connection.

20. Whatever "competitive" wireline voice services exist are thus ultimately dependent upon

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12. *Local Competition Report* as of December 31, 2013, at 21, Table 10.

13. FCC, *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, 18th Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 15-125, DA 15-1487, rel. Dec. 23, 2015 ("*18th Wireless Competition Report*").

either a legacy circuit-switched provider such as an ILEC, or a broadband ILEC or cable MSO. Most CLEC switched services involve underlying ILEC wholesale services, either resale exchange access lines, UNE-L, or UNE-P. And virtually all VoIP services, fixed or nomadic, require a broadband connection to the customer's premises from an underlying ILEC- or MSO – notably, the same two entities that are the primary providers of retail wireline voice services as well as (in the case of switched services) the provider of the underlying wholesale transport and distribution facilities that are critical inputs to most competing retail wireline switched access services. To the extent that any competing wireline voice service is itself dependent upon an underlying service for which no effective competition exists, wireline voice service cannot be said to itself be subject to effective competition.

RESPONSES TO SPECIFIC OII INFORMATION REQUESTS

IR 9: Is wireless voice a close substitute for wireline voice services?

21. IR 9 asks about "the extent to which wireless and wireline services are substitutes for one another" and whether there are "barriers to such substitution, and what are the limits of such substitution." Adam Clark is addressing this issue at greater length as it relates to wireless broadband, and Tony Tully is addressing fixed wireless, in their testimony for ORA. Dr. Katz, however, appears to have concluded that wireline and wireless are close substitutes, although he offers no specific facts or analysis to support this claim. Apparently, Dr. Katz views the fact that both wireline and wireless services can generally be used to place and receive voice telephone calls as a sufficient basis to establish their inherent substitutability and thus satisfy his "meaningful alternatives" standard.

22. Dr. Katz's proposed analytical framework for the determination as to the presence of effective competition "requires generally that consumers have access to meaningful alternatives" and that "two conditions establish effective competition: (a) the availability of multiple competing options from independent suppliers, and (b) the ability of some (but not necessarily all) consumers to switch among those options."[14] He further asserts that, "[i]mportantly, options need not be identical to one another in order to impose competitive discipline. Competing

14. Katz (AT&T), at 8-9.

products may differ along both price and non-price dimensions."[15] From these principles, he concludes that the presence of *wireless* voice services makes the *wireline* voice market effectively competitive, despite the fact that large numbers of retail consumers have not discontinued their wireline service in favor of wireless.

23. Dr. Katz cites data from the Center for Disease Control and Prevention ("CDC") purporting to show that, "by June 2015, 55 percent of children and 47 percent of adults lived in wireless-only households."[16] Notably, the FCC *Local Competition Report* suggests that the actual number of "wireless-only households"is much smaller. Nationally, as of December 2013, the total number of residential wireline switched access and VoIP connections is given as 75.25-million, representing 62.2% of the roughly 121-million US households as of December 2013. For California, the same *Local Competition Report* puts the number of residential wireline connections (all types) at 8.61-million, or about 68.2% of the 12.62-million California households.[17] Thus, in California, only about 31.8% of households are "wireless only," far short of the 47% that Dr. Katz attributes to the CDC study. Nevertheless, according to Dr. Katz's construct, the fact that at least some customers have abandoned their wireline services and substituted wireless is sufficient, and that the availability of wireless will act to constrain wireline prices.

15. *Id.*

16. *Id.*, at 13.

17. FCC, *Local Competition Report as of December 31, 2013*, at 21.

24. There is no question but that fixed wireline telephone service and mobile wireless voice service are substitutes for many households, but certainly not for all. Wireless voice may be seen by some as offering greater functionality overall, since wireless phones can be used both at home and away, whereas wireline phones can only be used at home. Indeed, wireless penetration is pushing close to 100%,[18] yet *roughly two-thirds of users who have wireless handsets still retain their wireline service, paying whatever it costs them to do so*. And for those who perceive a need to retain their wireline service for any of several reasons – such as reliable access to 911 emergency response service, residential alarm service, medical monitoring, and other specific needs – *and who have demonstrated their willingness to pay for wireline service in addition to wireless*, wireless is clearly not a particularly good or close substitute. Superficial similarities in the functionality of wireless and wireline voice services of the type being suggested by Dr. Katz are belied by the significant number of households that have retained their wireline service despite also having one or more wireless phones.

25. Dr. Katz has offered no analytical nor quantitative support for his proposition that the existence of *wireless* makes the *wireline* voice market effectively or even sufficiently competitive to assure that, for the two-thirds of residential consumers who feel the need to retain wireline service, the existing and prospective level of competition will assure just and reasonable rates. Indeed, a comparison of wireline and wireless pricing trends over the past decade reveals

18. As of October 2011, "The number of mobile devices rose 9 percent in the first six months of 2011, to 327.6 million — more than the 315 million people living in the U.S., Puerto Rico, Guam and the U.S. Virgin Islands" i.e., wireless phone penetration had exceeded 103% as of nearly five years ago. "Number of cellphones exceeds U.S. population: CTIA trade group," *Washington Post*, October 11, 2011, https://www.washingtonpost.com/blogs/post-tech/post/number-of-cell-phones-exceeds-us-population-ctia-trade-group/2011/10/11/gIQARNcEcL_blog.html

1 Dr. Katz's claim to be fatally flawed. If *wireless* was acting to constrain *wireline* voice pricing,
2 we should expect to see the prices in both sectors track one another closely – a drop in wireless
3 prices should be mirrored on the wireline side as wireline carriers react to the putative
4 competitive inroads of their wireless rivals.[19] This is not happening. Wireless prices have been
5 decreasing; measured-use voice and text block-of-time pricing has been replaced by unlimited
6 calling plans; even broadband data usage tiers have been expanding in size, and "rollover"
7 features have been introduced to further reduce the incidence of "overage" charges. Wireless
8 carriers have also shifted away from term contracts and early termination penalties, adopting
9 pricing plans that unbundle the handset from the service.[20] In contrast and as summarized in
10 Table 7 below, there have been few if any reductions in wireline pricing over the corresponding
11 time frame. Basic wireline services continue to offer very restrictive local calling areas, no
12 service features at all, and exceptionally high per-use toll charges for calls to points beyond the
13 defined local calling area.[21] Wireline carriers have introduced higher-priced "bundles" that
14 include more expansive calling scopes (including nationwide), a package of calling features, and
15 unlimited outbound calling.[22] However, the prices for these bundles have either remained

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19. Of course, characterizing wireless providers as "rivals" to ILECs is something of an overstatement, inasmuch as the two largest wireless carriers – Verizon Wireless and AT&T Mobility – representing some 68.2% of the 382.3-million wireless phones in the US as of June 30, 2015, are *wholly-owned* subsidiaries of Verizon and AT&T, the two largest ILECs in the US. *18th Wireless Competition Report*, at para. 15, Table II.B.1.

20. See, e.g., "Sprint to Abandon Two-Year Contracts," *Wall Street Journal*, August 18, 2015 http://www.wsj.com/articles/sprinttoabandontwoyearcontracts1439837235 (accessed 05/26/2016).

21. ORA DR 1-3, responses of AT&T, Verizon/Frontier, and Consolidated Communications.

22. ORA DR 1-3. AT&T's "Local/LD bundle" includes "Nationwide; unlimited calling" and "Choice of 4 features from the following: Call Forwarding Busy Line/No Answer, Call Forwarding - Variable, Call Waiting, Call Waiting ID, Call Return, Call Screening, Caller ID with Name with Anonymous Call Rejection, Caller ID with
(continued...)

constant or have increased, while wireless prices have dropped. These pricing trends are not consistent with Dr. Katz's rhetoric and superficial claims as to the "substitutability" of wireline and wireless services.

TABLE 7 HAS BEEN REDACTED

22. (...continued)
Number with Anonymous Call Rejection, Cancel Call Waiting, Repeat Dialing, Speed Dialing 30 and Three-Way Calling."; Frontier CA's (formerly Verizon CA) "Regional Essentials" Local/LD bundle includes "flat rate local, unlimited ZUM, unlimited Intralata toll" and "caller ID, call waiting/cancel call waiting, choice of one of the following Home Voice Mail standard or One point Voice Mail."

Competition in the voice market is utterly dependent upon the underlying broadband services, and that market is anything but effectively competitive

26. Even if there were merit in the various Respondents' contentions that the CPUC lacks jurisdiction with respect to broadband, an analysis of the state of competition in the *voice* market cannot be made without also addressing the broadband market upon which any such voice competition is itself utterly dependent. In addition to their ability to limit competition in the dependent voice market, the Respondents' ability to bundle prices of voice, broadband and video services, together with the persistent refusal on the part of broadband providers to offer competing retail providers any wholesale access to their networks, can operate to foreclose entry to standalone voice service providers. Moreover, the integrated Respondents provide these three categories of service over a common facilities network infrastructure, utilize common organizational resources, and enjoy substantial economies of scope and scale that stem directly from their involvement in multiple related industry sectors as well as their "first mover" incumbency advantages. Thus, the need for the Commission to address broadband would exist *even if its jurisdiction were entirely confined to voice telephony*.

Most facilities-based telecommunications markets are not "contestable"

27. For many years (particularly during the 1990-2005 time frame, including the period covering the formulation of the URF), incumbent telecommunications providers based much of their claims as to the presence of "effective competition" upon the so-called theory of "contestable markets," a notion being advanced by their economist witnesses that the "threat of entry" alone was fully sufficient to constrain an incumbent's exercise of market power. With

nearly all legal bars to entry rescinded, they deemed all telecommunications markets to be "contestable" even if no actual entry occurred, because the *possibility* of entry was held to be fully sufficient to prevent any incumbent from imposing excessive prices.[23]

28. Notably, there is no mention of or reference to the "market contestability" theory in either the Aron or Katz testimony here. Indeed, Dr. Katz now readily concedes that "producers in real-world markets including wireline voice providers often utilize research, production, distribution, or other technologies characterized by economies of scale, density, and scope" and that "[i]n the presence of economies of scale and density, *it is economically inefficient and unlikely to be commercially viable to have a very large number of suppliers, each operating at a small scale or low density*."[24] Dr. Katz is, of course, entirely correct in his assessment of conditions pertaining to the *supply* side of most telecommunications markets and, although he does not use the term, he is clearly conceding that the provision of telecommunications services is characterized by a relatively high Minimum Efficient Scale ("MES"). As I discussed at length in my March 15, 2016 testimony at paras. 25-34, the higher the MES, the smaller the number of firms that can viably compete in any market. If the MES is at or near 50%, then the maximum number of potentially viable firms would be 1/0.5, i.e., 2. The presence of extreme economies of scale and scope, together with a variety of entry barriers arising from proprietary research,

23. William J. Baumol, John C. Panzar and Robert D. Willig, *Contestable Markets and the Theory of Industry Structure*, New York: Harcourt Brace Jovanovich, Inc., 1982.

24. Katz (AT&T), at 7, emphasis supplied.

legacy construction, patents, all operate to make further facilities-based entry difficult to impossible except at a very localized, geographically limited level.

29. In fact, as evidence adduced in the recent "change of control" proceedings[25] has demonstrated, not only is it "unlikely" to have "a very large number of [facilities-based] suppliers" in telecommunications markets, it is also "unlikely" to have even as many as two or three facilities-based suppliers in most locations. Where construction of a facilities-based distribution infrastructure is involved, there are formidable, and frequently insurmountable, economic barriers to facilities-based entry, and as such it may be unrealistic to expect additional facilities-based entry to occur. Moreover, in the handful of markets where an entrant might choose to overbuild an existing distribution network (e.g., Google fiber in a few selected markets), incumbents are not bound by any uniform national – or even statewide – pricing constraints, and are free to target any market where entry, or the threat of entry, occurs, shifting profits generated in monopoly or near-monopoly markets to cover any short-term losses arising from such selective price targeting. One need look no further than the airline industry, where such market-specific city-pair pricing tactics are rampant.

30. As it relates to wireless, while there are currently four national wireless providers in the US, that number is itself a result of a regulatory decision, applied in the case of several recent proposed mergers of national wireless carriers, that fewer than four incumbents would limit

25. *Comcast/TWC/Bright House*, A.14-04-013/A.14-06-012; the transfer of control of Verizon's ILEC operations in California, Texas and Florida to Frontier Communications, A.15-03-005; and *Charter/TWC/Bright House*, A.15-07-009.

competition.[26] And in any event, in any prospective facilities-based entrant in the wireless market will require electromagnetic spectrum, an expensive commodity that remains in very limited supply, there is clearly an upper bound to the development of wireless capacity in response to growth in demand.[27]

31. Thus, whatever theoretical merit might exist with respect to the notion that *potential entry* makes a market "contestable" and that when a market is "contestable" incumbents will be forced to limit their exercise of market power, where entry is not possible other than at the fringes of a market, there is nothing to constrain the incumbents' exercise of market power.

32. It is thus difficult to square Dr. Katz's accurate assessments regarding supply conditions extant in telecommunications markets with his conclusion that such markets are nevertheless subject to effective competition. Apparently, Dr. Katz believes that even in the face of severe supply constraints, effective competition will still materialize as long as a superficially similar "substitute" service can be identified:

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26. FCC Chairman Tom Wheeler issued the following statement regarding the proposed Sprint/T-Mobile merger: "Four national wireless providers are good for American consumers. Sprint now has an opportunity to focus their efforts on robust competition." Statement by FCC Chairman Tom Wheeler on Competition in the Mobile Marketplace, August 6, 2014. https://www.fcc.gov/document/chairman-wheeler-statement-competition-mobile-marketplace

27. To some extent, the absolute constraint on spectrum availability is being partially overcome by technology, which is finding ways of compressing voice, data and particularly video into less bandwidth. Also, wireless carriers are integrating licensed wireless spectrum and unlicensed wi-fi, thereby expanding the potential capacity of their overall network. As I shall discuss in more detail below, there is far more competition in the wireless market than in any wireline (voice or broadband) segment.

> Effective competition requires generally that consumers have access to meaningful alternatives. Specifically, two conditions establish effective competition: (a) the availability of multiple competing options from independent suppliers, and (b) the ability of some (but not necessarily all) consumers to switch among those options. Importantly, options need not be identical to one another in order to impose competitive discipline. Competing products may differ along both price and non-price dimensions.

As I shall discuss in greater detail at paras. 83-91 below, this rather simplistic view implicitly assumes homogeneity in the market, such that providers have no ability to identify different market segments with different demand properties and to target each separately and where practical independently of one another. To the extent such segmentation is practical, Dr. Katz's analysis cannot withstand scrutiny.

IR 10. How and to what extent do competition and consumer choices vary by geographic market in California?
IR12. How much competition is there for advanced telecommunications services at the new national standard of 25 Mbps down (and 3 Mbps up)?

33. The quantitative data produced by Respondents provides a basis for evaluating the full extent of competitive service availability, substitutability, economies of scale/scope, and the degree to which effective competition can be said to exist in any given market segment. The analytical framework presented in my March 15 testimony – the Structure-Conduct-Performance ("S-C-P") Paradigm – provides a consistent approach to the analysis of the market data as submitted by Respondents and from other sources, and for developing policy recommendations as requested in IR 23. The following section of my testimony addresses IRs 10, 11, 12, portions of 22, and 23. For each IR, I incorporate the relevant SCP element(s.

34. Economic theory suggests – and the FCC's just-released *Business Data Services Order* confirms – all else equal, an inverse relationship between the number of competitors in a given market and the price levels that prevail in each such market. Although highly interrelated, there are a number of separate and distinct "telecommunications markets" to which the OII and, in particular, IR 10 applies. It is therefore useful, at the outset, to address the matter of *market definition*. As I explained in my March 15 testimony, the "relevant" market is defined in the literature along both product and geographic dimensions and is based upon substitution possibilities both in consumption (i.e., on the demand side) and in production (i.e., on the supply side).[28]

Market Definition

35. Any analysis of a market's structure, conduct or performance must first address the proper definition and scope of the "market" under examination. An overly broad market definition may conceal the presence of segments dominated by one or a few firms simply by

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28. F.M. Scherer and David Ross, *Industrial Market Structure and Economic Performance*, Third Edition (Boston: Houghton Mifflin Company), 1990, at 75-76:

> The ideal definition of the market must take into account substitution possibilities in both consumption and production. On the demand side, firms are competitors or rivals if the products they offer are good substitutes for one another in the eyes of buyers...The essence of the matter is what happens when price relationships change. If the price of Product A is raised by small but meaningful percentage and as a result consumers substitute Product B for Product A in significant quantities, then A and B are good substitutes and ought to be included under a common market definition...
>
> Substitution on the supply side must also be considered. Groups of firms making completely nonsubstitutable products may nevertheless be meaningful competitors if they employ essentially similar skills and equipment and if they could move quickly into each others' product lines should the profit lure beckon.

combining them with other, often unrelated segments, thereby diminishing the importance of individual segments and in so doing understating the extent to which market power may be present in one or more segments. Conversely, an overly narrow market definition may understate the presence of effective competition by defining competing firms as falling in different markets.

36. Markets are generally defined with respect either to *product* or to *geography*. A "relevant product market" includes one or more categories of products that are broadly perceived as close substitutes, such that a change in the price of one product will directly affect the demand for the other(s) within the same product market. Similarly, a "relevant geographic market" includes an area within which consumers or suppliers are willing to move in order to effect transactions, such that the price of the product in one portion of the geographic market will directly and materially affect the demand for the product elsewhere in the same geographic market area.

37. Two relevant product markets are under examination in this proceeding:

(1) Wireline voice telephone service

(2) Broadband Internet access satisfying the current FCC definition of "advanced telecommunications service" – i.e., "broadband" – at 25 Mbps in the download direction and 3 Mbps in the upload direction.[29]

Substitution in Demand and Substitution in Supply in Product vs. Geographic Markets

38. Although the principal focus of IR 10 is on the extent to which "competition and consumer choices vary by geographic market in California," not all categories of telecommunications services are likely to exhibit similar geographic variation. Accordingly, in order to address geographic differences in the level of competition, it is first necessary to examine the individual *product markets* about which this analysis will be undertaken. Products that are close substitutes for one another can be considered as falling within the same "relevant product market." The degree to which such products are substitutable is extremely important in determining whether they fall within the same or different product markets. Products can sometimes be considered as falling within the same product market while at other times be thought of as being in separate markets. Generally, where the two candidate products exhibit high cross-elasticity, they may be considered as falling within the same market. When two candidate products are highly cross-elastic, an increase(decrease) in the price of one will produce a corresponding increase(decrease) in the quantity demanded of the other. Thus, an increase in

29. *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, FCC GN Docket No. 14-126, *2015 Broadband Progress Report and Notice of Inquiry of Immediate Action to Accelerate Deployment*, FCC 15-10 (rel. February 4, 2015 ("*2015 Broadband Progress Report*"), at para. 3.

the price of beef would normally result in an increase in the demand for chicken, and vice versa. Under these circumstances, it is difficult for a provider to exercise market power over one of these products (assuming they are being produced by independent suppliers) because the potential for substitution permits customers to easily shift their purchases from one product to the other.

39. There are quantitative tests of such interdependence. Testing for specific cross-elastic effects may in some cases require a controlled experiment – i.e., holding the price of one product constant while varying the price of the other. The use of time-series data (or a combination of time-series and cross-sectional data in a so-called "panel model") may sometimes provide this type of information. Where this is not possible, tracking the relationship between the prices of the two candidate products over time – even in the absence of corresponding demand (quantity) data – may still be quite useful in supporting an assessment as to the degree to which the candidate products are close substitutes. Specifically, if the two products' prices tend to move up or down together, one can infer that the two products are close substitutes. Where prices diverge, the indicated conclusion is that they are not in the same relevant product market, that demand conditions influencing one are not having a corresponding effect upon the other.

40. Demand substitution can also be examined with respect to geographic markets. If customers can easily migrate from one geographic location to another in response to price differentials between the two, then the geographies are not isolated, and a change in price in one area will have the effect of increasing demand in the other. The extent to which customers willingly engage in such geographic substitution will vary from product to product, and will be

particularly affected by the cost associated with rehoming the purchase to a more distant location. For example, a customer might be willing to drive some distance in order to obtain a lower price on a major consumer durable purchase, but might be unwilling to do so to same a small amount of money on the purchase of one or two small grocery items. Thus, two grocery stores in nearby towns might be in separate geographic markets, whereas two major appliance, furniture, or automobile dealers in those same two towns might find themselves serving the same geographic market. As with product markets, the extent to which the price levels across different geographic areas converge or diverge is indicative of their inclusion within the same relevant geographic market.

41. Substitution in supply can occur when a firm operating in some (but not all) product and/or geographic markets can easily enter an adjacent (geographic and/or product) market. It has been suggested, for example, that the presence of high-capacity fiber into a particular commercial building or commercial district creates the potential for the service provider to extend its fiber optic distribution network into other nearby buildings. On the other hand, if there are high costs associated with such "lateral" construction, the fact of geographic proximity may not be dispositive of the ability or willingness of the provider to invest in the additional facilities. On the product side, the presence of a wireline voice services provider may or may not facilitate entry by that carrier into an adjacent product market, such as wireless voice or wireline broadband.

42. Wireline voice (telephone) and broadband (cable) carriers have rarely ventured beyond their primary geographic footprint. Instead, they have tended to extend their geographic reach through mergers or acquisitions of non-overlapping but otherwise similar wireline carriers.[30]

43. There are a number of candidate telecommunications product markets that exhibit varying degrees of substitution in demand and/or supply. For example, ILECs have traditionally offered "basic" local exchange access services offering extremely limited geographic calling scopes and no service features such as call waiting, voice mail, caller ID, three-way calling, or call forwarding. Most other voice service providers, including cable MSOs, wireless carriers, and over-the-top ("OTT") VoIP providers, include in their "basic" voice service offering a full suite of service features as well as significantly larger geographic calling scopes extending, in some cases, to the entire United States and Canada. Notably, despite having experienced a precipitous drop in demand for basic local telephone service access lines in recent years,[31] ILECs have made few if any significant changes to their basic local service products. They have introduced optional expanded calling area and bundled feature packages, but at often significantly highly prices than for the basic offering (see Table 7, *supra.*). In some cases, the pricing of these "optional" ILEC services exceeds the prices being charged by other voice

30. See, e.g., *Joint Application of Çharter Communications, Inc. et al;Time Warner Cable Inc. et al,; Bright House Networks, LLC et al Pursuant to California Public Utilities Code Section 854 f'or Expedited Approval of the Transfer of Control*, Public Version, July 2, 2015, CPUC A.15-07-009, at 23: "The combination of New Charter's greater geographic reach and more rationalized footprint following the Transaction will position New Charter to better compete for enterprise customers, and thus improve competition in that sector."

31. For example, as of December 2003, there were 23.2-million ILEC retail switched access lines in California. A decade later, by the end of 2013, that number had fallen by a third, to 15.5-million such lines. FCC *Local Competition Reports* as of December 31, 2003, at Table 9 and December 31, 2013, at Table 14.

providers for comparable service packages and bundles.[32] Although we do not have product-specific demand data from which to derive price and cross-price elasticities, the persistence of these ILEC products and pricing practices over time supports a strong inference that for a large portion of residential voice service customers, there is still no close substitute for the ILEC service, a condition that the ILECs have exploited through a succession of price *increases* over a time period during which the scope of other voice services has been expanding and the prices of such services have been dropping.

44. Broadband services can similarly be separated on the basis of several attributes – wireline vs. wireless, bandwidth (speed), and fixed vs. mobile. Another important product distinction relates to the manner in which a particular broadband service is being offered – as a stand-alone service, or bundled with other services or products.

45. ILECs have traditionally offered relatively low bandwidth ADSL bundled with their voice service. Merger conditions imposed upon AT&T and Verizon in connection with their respective 2005 mergers with SBC and MCI, respectively, required the offering of stand-alone or "naked" DSL for a limited period of time,[33] but failed to specifically address the pricing of the

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32. For example, AT&T (Pacific Bell) offers a local/toll/features bundle called "Local/LD bundle" for $78.45 per month that includes "Nationwide; unlimited calling" and a choice of four calling features. See Table 7, *supra.*

33. AT&T's and Verizon's commitment each required that the post-merger company commence offering stand-alone ADSL within twelve months following the closing date of the merger with SBC and that it maintain the stand-alone ADSL offering for only two years following the "implementation date" of the stand-alone service. *I/M/O SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control*, WC Docket No. 05-65, *Memorandum Opinion and Order*, FCC 05-183, 20 FCC Rcd 18290; 2005, FCC LEXIS 6385; 37 Comm. Reg. (P & F) 321, Rel. November 17, 2005, at Appendix F; *I/M/O Verizon Communications Inc. and MCI, Inc.*

(continued...)

stand-alone ADSL vs. the additional charge for ADSL when purchased in conjunction with voice telephone service. In any event, the demand for "naked DSL" never really materialized, and to the best of my knowledge the service was discontinued by both companies at or shortly after the merger conditions had expired.

46. At the time of the two mergers, DSL provided by ILECs was the principal, often the only, form of broadband service being offered to most residential customers. The "naked DSL" merger conditions were imposed so as to protect competition in the *voice* market by eliminating the tying between the potentially competitive voice service and the (then) largely monopolistic DSL. While the specific conditions of the voice and broadband markets have evolved in the decade since the two mergers, the competitive importance of bundling broadband with other services has not. Over the past decade, cable MSOs largely completed the conversion of their video distribution networks from analog to digital, enabling them to offer high-=speed broadband Internet access bundled with video and also with voice services. ILECs responded by introducing video services of their own and/or by partnering with a satellite television provider to create double-play and triple-play bundles. AT&T introduced U-verse, a bundle of voice, DSL and video, but continued to use its basic copper distribution infrastructure, severely limiting the total amount of bandwidth that could be offered. In 2015, AT&T completed its acquisition of DirecTV, affording it the ability to offer a full suite of video channels (via satellite) bundled with somewhat improved DSL broadband and voice telephone service. Even though video

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33. (...continued)
Applications for Approval of Transfer of Control, WC Docket No. 05-75, *Memorandum Opinion and Order*, 20 FCC Rcd 18433; 2005 FCC LEXIS 6386; 37 Comm. Reg. (P & F) 416, FCC 05-184
November 17, 2005

services are beyond the scope of this proceeding, the inclusion of video in a voice/broadband bundle affects the demand for services that are within the scope of the Commission's jurisdiction, and thus materially influence the demand and pricing of these jurisdictional services.

47. Finally, the geographic availability of a potentially competing service – such as over-the-top voice – is governed by the availability and pricing of an underlying service – e.g., broadband. Where the dependent (over-the-top) service competes directly with service that is offered by the facilities-based provider of the underlying broadband service, the facilities-based provider is in a position to manage – and potentially limit – the demand for the competing dependent service. For example, by shifting revenues away from voice and onto the less competitive broadband service, the facilities-based provider can effectively undercut the nonaffiliated OTT voice provider.

Market Structure

48. While market shares and market concentration are not, in and of themselves, dispositive of the extent to which any given market will achieve a competitive outcome or market failure, there can be no question that the prospects for an effective and robustly competitive market are greater for markets with a relatively large number of viable firms than for markets with only a single or a very small number of participants. At the very least, a market share/market concentration analysis can provide shadow evidence of potential market failure but cannot by itself offer specific explanations for the structural condition of the market. It is for this reason

that the S-C-P paradigm considers other non-structural factors, specifically market conduct and market performance.

49. In my March 15, 2016 testimony, I identified a number of specific structural indicia that were relevant to an S-C-P analysis. These included the following:

(2) Market share, concentration, and market power of infrastructure-based markets must be assessed only with respect to the specific geographic areas being served by each incumbent.

(3) The number and the relative size and strength of competing firms must be sufficient to engender actual price competition;

(7) The mere existence of any provider offering similar or substitute services is not by itself sufficient to constrain the market power of the incumbent.

(8) Effective competition requires more than two incumbent providers.

The following analysis addresses these structural issues.

50. Incumbent wireline LECs and incumbent cable MSOs each have assigned geographic operating areas ("footprints") that are generally non-overlapping within each of these two

provider categories. As noted above, ILECs and incumbent MSAs have expressed little or no interest in expanding beyond their core footprint into areas currently being served by another non-overlapping counterpart. Accordingly, a separate competitive availability analysis is needed for each incumbent provider's operating footprint. Although an individual provider's share of the aggregate state or national market may be of some interest, particularly with respect to an assessment of the firm's *monopsony* power with respect to upstream purchases of inputs, *monopoly* power must be assessed separately with respect to each provider's own service area. This is the approach I used in each of the three recent Sec. 854 cases in which I participated on behalf of ORA. That is, I provided an analysis of each of the merging and post-transaction firm's market power with respect to its specific pre- and post-transaction footprint. That same approach needs to be utilized here as well.

51. The analysis must also be confined to *facilities-based* providers – those not dependent upon an upstream provider for any major network facility input. Firms that rely upon capacity leased from others – particular where the lessor is itself a competitor in the same geographic and product market – offer no additional source of competition beyond that offered by the facilities-based upstream provider. Indeed, in its May 2, 2016 *Business Data Services Order*, the FCC specifically addresses this point:

> As part of our data collection, carriers reported their aggregate Business Data Services revenues. These provide an approximate indication of the revenue shares of different provider types supplying sophisticated services to end users, that is, of revenue shares in the supply of Business Data Services and more complex managed services. ... [I]ndependent competitive LECs, that is, competitive LECs not affiliated with incumbent LECs, only capture 18% of Business Data Services

> revenues. However, this estimate is subject to three biases, which in aggregate overstate the shares of independent LECs. First, a greater proportion of incumbent LECs' sales of Business Data Services and managed services are Business Data Services as compared with competitive LECs, a bias that likely overstates incumbent LEC revenue shares. Second, *because a valid measure of concentration would measure facilities-based revenues, rather than resale revenues, and because a substantial proportion of incumbent LEC Business Data Services sales are to competitive LECs who then resell those services*, the preceding bias is likely to be more than offset (managed service revenues earned on the resale of incumbent LEC Business Data Services will be greater than the LEC Business Data Services sales to the resellers). Third, there is the bias identified immediately above from measuring national shares.[34]

52. Further to this point, competition that is based upon or requires the customer's use or access to service provided by a facilities-based carrier should also be excluded from the market share and market concentration analysis. As the FCC observes:

> While wholesale access can be a cost effective means for a competitive LEC to expand its reach, such a wholesale purchaser cannot place competitive pressure on supply of the underlying facility that it purchases, but rather can only compete by being more efficient at retailing. *Thus, we do not consider competition over resold lines as a material competitive restraint on any facility-based supplier with market power.* Moreover, we are told that in some cases an incumbent LEC's wholesale prices can be near or above retail levels (sometimes referred to as a "price squeeze"). Similarly, we are told that rates below retail, available through many incumbent LEC purchase agreements, also can create barriers to entry when they include "penalty clauses and loyalty discount provisions in their wholesale contracts" that are not related to a competitive efficiency and simply have the effect of raising the rival's cost. XO, for example, generally declines to build facilities when doing so will increase its risk of falling short of a minimum purchase requirement under an incumbent LEC commitment plan. Level 3 similarly reports added costs due to incumbent LEC loyalty agreements, which forecloses an opportunity to purchase from other lower-priced wholesale inputs.

34. *Business Data Services Order*, at para. 217, emphasis supplied, citations omitted.

> In the end, competition is constrained. A motivated and efficient competitive LEC, such as Level 3 – the largest competitive LEC and the third largest provider of fiber optic internet access (based on coverage area) in the United States – only "deploy[s] new loops to approximately 3,000 to 4,000 commercial buildings in the U.S. each year."[35]

53. With the exception of a limited number of large multi-dwelling unit ("MDU") buildings, non-cable CLECs rarely own distribution (loop) facilities to residential customer premises. In order to serve such customers, the CLEC must lease the underlying facility from a facilities-based carrier, either as a UNE-L (an Unbundled Network Element Loop) or as total local exchange access service for resale. Of the 1.66-million non-cable CLEC lines in service in California as of December 31, 2014, only 475,000, or about 28.6%, were owned by the CLEC.[36] The FCC data does not distinguish between residential and business customers with respect to CLEC ownership, but it is likely that the vast majority of the 475,000 non-cable CLEC-owned lines in California are associated with *non-residential* customers. Over-the-top (OTT) VoIP requires that the customer obtain broadband access from either the ILEC or the cable MSO serving the customer's location; The fact that the OTT provider is not itself the purchaser of the upstream broadband input does not materially alter the dependence of the putatively competing service upon the upstream facilities-based service as an essential input. In California as of December 31, 2014, the 559,000 residential OTT VoIP subscriptions represents roughly 6.9% of

35. *Id.*, at para. 230, citations omitted, emphasis supplied.

36. FCC Industry Analysis and Technology Division, Wireline Competition Bureau, *Voice Telephone Services Status as of December 31, 2014*, Supplemental Table 1 (California), in "VTS_ST1 (Subscriptions)_w_datadict_0 as of Dec 2014.xlsx" for CA, data as December 31, 2014.

the total 8.06-million total residential switched access, fixed VoIP and OTT VoIP lines statewide.[37]

54. Because wireline services are not portable, both availability and subscription data should be analyzed at most granular geographic levels available – i.e., census blocks (preferred), then census tracts. Wireless services can be examined at an "Economic Area" ("EA") level, but carrier signal strength data (from carrier websites) should be examined to identify coverage gaps.

The lack of consumer choice of broadband service providers in California

55. In the case of *fixed* voice and broadband services, the relevant geographic market is very small. With respect to *demand* considerations, its scope is no larger than an individual customer premises, in that it is extremely unlikely that a customer would be willing, or could be induced, to relocate her home or business to a different address solely for the purpose of obtaining a competing voice or broadband service. On the supply side, having facilities in close proximity to a potential customer's premises may reduce the incremental cost of serving that customer with provider-owned facilities. However, that is not always the case (as I have noted from personal experience at fn. 23 in my March 15, 2016 testimony) and as the FCC has found with respect to the high cost of deploying "lateral" facilities into unserved buildings even where an existing fiber "ring" is in existence.[38] Not surprisingly, and as shown in Table 8 below, roughly 75% of

37. *Id.*

38. *Business Data Services Order*, at paras. 55, 212.

all California households have no competitive choice with respect to wireline broadband services meeting the FCC's 25/3 minimum standards. Tables 8A and 8B provide corresponding service availability data by county, both alphabetically (Table 8A) and ranked by competitive availability, from lowest to highest (Table 8B). Table 9 summarizes the availability of competitive broadband in each principal California Metropolitan Area. Figure 1 provides a map of California showing, for each county, the percentage of households for which two or more providers currently offer broadband access at 25/3 or more.

Table 8

STATEWIDE AVAILABILITY OF COMPETING BROADBAND PROVIDERS OFFERING 25/3 BROADBAND ACCESS SERVICE (AS OF DECEMBER 2015)

No. of Providers Total	Total with 25/3 availability	0 % of Total	1 % of Total	2 % of Total	3 or More % of Total
Census Blocks					
709,128	397,128	312,000	307,699	85,170	4,259
	56.0%	44.0%	43.4%	12.0%	0.60%
Households					
12,830,035	12,078,480	751,555	8,839,686	3,037,259	201,535
	94.1%	5.9%	68.9%	23.7%	1.6%

Sources: Respondent submissions relating to IR 6(a) as of 12/31/2015. Data relating to other providers was obtained from FCC Form 477 Data as of 06/30/2015. Note that number of households passed is based upon 2015 Census Bureau Data because individual Respondents did not provide consistent and comparable data for the number of households passed.

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Table 8A (Page 1 of 3)

**AVAILABILITY OF COMPETING BROADBAND PROVIDERS
OFFERING 25/3 BROADBAND ACCESS SERVICE
BY COUNTY
(As of December 2015, Alphabetical Order)**

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
Alameda	554,954	13,442 (2.42%)	319,794 (57.63%)	212,667 (38.32%)	9,052 (1.63%)	- -	221,719 (39.95%)
Alpine	501	454 (90.54%)	47 (9.46%)	- -	- -	- -	- -
Amador	14,686	10,593 (72.13%)	4,081 (27.79%)	12 (0.08%)	- -	- -	12 (0.08%)
Butte	89,398	10,768 (12.05%)	78,630 (87.95%)	- -	- -	- -	- -
Calaveras	19,135	5,911 (30.89%)	12,569 (65.68%)	655 (3.42%)	- -	- -	655 (3.42%)
Colusa	7,227	4,461 (61.72%)	2,743 (37.96%)	23 (0.32%)	- -	- -	23 (0.32%)
Contra Costa	382,883	9,236 (2.41%)	237,847 (62.12%)	114,227 (29.83%)	20,938 (5.47%)	635 (0.17%)	135,799 (35.47%)
Del Norte	9,974	611 (6.13%)	9,363 (93.87%)	- -	- -	- -	- -
El Dorado	70,822	17,315 (24.45%)	52,790 (74.54%)	717 (1.01%)	- -	- -	717 (1.01%)
Fresno	299,452	39,163 (13.08%)	248,640 (83.03%)	11,649 (3.89%)	- -	- -	11,649 (3.89%)
Glenn	10,020	3,632 (36.25%)	6,292 (62.80%)	95 (0.95%)	- -	- -	95 (0.95%)
Humboldt	56,060	12,256 (21.86%)	43,620 (77.81%)	184 (0.33%)	- -	- -	184 (0.33%)
Imperial	49,792	6,658 (13.37%)	43,134 (86.63%)	- -	- -	- -	- -
Inyo	8,068	1,716 (21.27%)	6,352 (78.73%)	- -	- -	- -	- -
Kern	262,965	29,222 (11.11%)	225,873 (85.89%)	7,870 (2.99%)	- -	- -	7,870 (2.99%)
Kings	42,259	7,804 (18.47%)	32,599 (77.14%)	1,855 (4.39%)	- -	- -	1,855 (4.39%)
Lake	27,491	4,520 (16.44%)	22,971 (83.56%)	- -	- -	- -	- -
Lassen	10,073	4,663 (46.30%)	5,410 (53.70%)	- -	- -	- -	- -
Los Angeles	3,285,160	12,320 (0.38%)	2,255,473 (68.66%)	1,006,268 (30.63%)	11,098 (0.34%)	- -	1,017,367 (30.97%)
Madera	44,632	16,850 (37.75%)	25,838 (57.89%)	1,945 (4.36%)	- -	- -	1,945 (4.36%)

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Table 8A (Page 2 of 3)

AVAILABILITY OF COMPETING BROADBAND PROVIDERS OFFERING 25/3 BROADBAND ACCESS SERVICE BY COUNTY (As of December 2015, Alphabetical Order)

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
Marin	103,645	3,407 (3.29%)	79,011 (76.23%)	20,598 (19.87%)	629 (0.61%)	- -	21,227 (20.48%)
Mariposa	7,873	7,824 (99.38%)	49 (0.62%)	- -	- -	- -	- -
Mendocino	35,522	11,504 (32.39%)	15,944 (44.89%)	8,073 (22.73%)	- -	- -	8,073 (22.73%)
Merced	77,041	13,610 (17.67%)	59,760 (77.57%)	3,672 (4.77%)	- -	- -	3,672 (4.77%)
Modoc	4,105	4,105 (100.00%)	- -	- -	- -	- -	- -
Mono	5,816	5,659 (97.29%)	157 (2.71%)	- -	- -	- -	- -
Monterey	126,025	33,355 (26.47%)	88,417 (70.16%)	4,253 (3.37%)	- -	- -	4,253 (3.37%)
Napa	49,281	3,981 (8.08%)	38,455 (78.03%)	6,722 (13.64%)	124 (0.25%)	- -	6,845 (13.89%)
Nevada	41,181	14,745 (35.80%)	26,076 (63.32%)	361 (0.88%)	- -	- -	361 (0.88%)
Orange	1,012,422	27,304 (2.70%)	833,420 (82.32%)	151,329 (14.95%)	369 (0.04%)	- -	151,698 (14.98%)
Placer	138,060	33,505 (24.27%)	70,767 (51.26%)	32,784 (23.75%)	1,004 (0.73%)	- -	33,788 (24.47%)
Plumas	9,078	9,078 (100.00%)	- -	- -	- -	- -	- -
Riverside	706,222	22,065 (3.12%)	341,597 (48.37%)	339,495 (48.07%)	3,065 (0.43%)	- -	342,560 (48.51%)
Sacramento	521,639	24,294 (4.66%)	339,459 (65.08%)	141,534 (27.13%)	16,270 (3.12%)	81 (0.02%)	157,886 (30.27%)
San Benito	17,176	2,687 (15.64%)	14,077 (81.96%)	412 (2.40%)	- -	- -	412 (2.40%)
San Bernardino	620,812	34,947 (5.63%)	305,052 (49.14%)	280,773 (45.23%)	39 (0.01%)	- -	280,812 (45.23%)
San Diego	1,113,250	47,240 (4.24%)	984,579 (88.44%)	78,767 (7.08%)	2,664 (0.24%)	- -	81,430 (7.31%)
San Francisco	364,363	875 (0.24%)	86,305 (23.69%)	180,853 (49.64%)	76,402 (20.97%)	19,928 (5.47%)	277,183 (76.07%)
San Joaquin	220,294	17,079 (7.75%)	195,020 (88.53%)	8,195 (3.72%)	- -	- -	8,195 (3.72%)
San Luis Obispo	104,973	9,888 (9.42%)	94,803 (90.31%)	282 (0.27%)	- -	- -	282 (0.27%)

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Table 8A (Page 3 of 3)

AVAILABILITY OF COMPETING BROADBAND PROVIDERS OFFERING 25/3 BROADBAND ACCESS SERVICE BY COUNTY (As of December 2015, Alphabetical Order)

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
San Mateo	261,284	5,797 (2.22%)	140,096 (53.62%)	86,041 (32.93%)	26,001 (9.95%)	3,350 (1.28%)	115,391 (44.16%)
Santa Barbara	144,371	8,658 (6.00%)	134,238 (92.98%)	1,475 (1.02%)	- -	- -	1,475 (1.02%)
Santa Clara	625,869	28,212 (4.51%)	496,808 (79.38%)	95,345 (15.23%)	5,442 (0.87%)	62 (0.01%)	100,848 (16.11%)
Santa Cruz	95,749	4,039 (4.22%)	59,977 (62.64%)	30,378 (31.73%)	1,346 (1.41%)	10 (0.01%)	31,734 (33.14%)
Shasta	71,582	18,110 (25.30%)	53,440 (74.66%)	31 (0.04%)	- -	- -	31 (0.04%)
Sierra	1,487	1,462 (98.31%)	25 (1.69%)	- -	- -	- -	- -
Siskiyou	19,569	19,569 (100.00%)	- -	- -	- -	- -	- -
Solano	144,730	10,086 (6.97%)	124,133 (85.77%)	10,296 (7.11%)	215 (0.15%)	- -	10,511 (7.26%)
Sonoma	188,528	9,720 (5.16%)	110,224 (58.47%)	66,291 (35.16%)	2,293 (1.22%)	- -	68,584 (36.38%)
Stanislaus	166,438	10,679 (6.42%)	148,368 (89.14%)	7,391 (4.44%)	- -	- -	7,391 (4.44%)
Sutter	31,404	3,100 (9.87%)	27,678 (88.14%)	626 (1.99%)	- -	- -	626 (1.99%)
Tehama	24,082	11,824 (49.10%)	12,258 (50.90%)	- -	- -	- -	- -
Trinity	6,131	6,131 (100.00%)	- -	- -	- -	- -	- -
Tulare	134,612	45,611 (33.88%)	84,457 (62.74%)	4,544 (3.38%)	- -	- -	4,544 (3.38%)
Tuolumne	22,267	6,524 (29.30%)	15,743 (70.70%)	- -	- -	- -	- -
Ventura	270,879	4,992 (1.84%)	160,962 (59.42%)	104,925 (38.74%)	- -	- -	104,925 (38.74%)
Yolo	71,300	12,360 (17.34%)	45,829 (64.28%)	12,592 (17.66%)	498 (0.70%)	21 (0.03%)	13,111 (18.39%)
Yuba	25,423	5,935 (23.34%)	18,435 (72.51%)	1,053 (4.14%)	- -	- -	1,053 (4.14%)
STATEWIDE	12,830,035	751,555 (5.86%)	8,839,686 (68.90%)	3,037,259 (23.67%)	177,449 (1.38%)	24,087 (0.19%)	3,238,794 (25.24%)

Source: Respondent submissions relating to IR 6(a) as of 12/31/2015. Data relating to other providers was obtained from FCC Form 477 Data as of 06/30/2015. Note that number of households passed is based on 2015 Census Bureau Data because Respondents did not provide uniform data for number of households passed.

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**AVAILABILITY OF COMPETING BROADBAND PROVIDERS
OFFERING 25/3 BROADBAND ACCESS SERVICE
BY COUNTY
(As of December 2015, Ranked by competitive availability lowest to highest)**

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
Alpine	501	454 (90.54%)	47 (9.46%)	- -	- -	- -	- -
Butte	89,398	10,768 (12.05%)	78,630 (87.95%)	- -	- -	- -	- -
Del Norte	9,974	611 (6.13%)	9,363 (93.87%)	- -	- -	- -	- -
Imperial	49,792	6,658 (13.37%)	43,134 (86.63%)	- -	- -	- -	- -
Inyo	8,068	1,716 (21.27%)	6,352 (78.73%)	- -	- -	- -	- -
Lake	27,491	4,520 (16.44%)	22,971 (83.56%)	- -	- -	- -	- -
Lassen	10,073	4,663 (46.30%)	5,410 (53.70%)	- -	- -	- -	- -
Mariposa	7,873	7,824 (99.38%)	49 (0.62%)	- -	- -	- -	- -
Modoc	4,105	4,105 (100.00%)	- -	- -	- -	- -	- -
Mono	5,816	5,659 (97.29%)	157 (2.71%)	- -	- -	- -	- -
Sierra	1,487	1,462 (98.31%)	25 (1.69%)	- -	- -	- -	- -
Siskiyou	19,569	19,569 (100.00%)	- -	- -	- -	- -	- -
Plumas	9,078	9,078 (100.00%)	- -	- -	- -	- -	- -
Tehama	24,082	11,824 (49.10%)	12,258 (50.90%)	- -	- -	- -	- -
Trinity	6,131	6,131 (100.00%)	- -	- -	- -	- -	- -
Tuolumne	22,267	6,524 (29.30%)	15,743 (70.70%)	- -	- -	- -	- -
Shasta	71,582	18,110 (25.30%)	53,440 (74.66%)	31 (0.04%)	- -	- -	31 (0.04%)
Amador	14,686	10,593 (72.13%)	4,081 (27.79%)	12 (0.08%)	- -	- -	12 (0.08%)
San Luis Obispo	104,973	9,888 (9.42%)	94,803 (90.31%)	282 (0.27%)	- -	- -	282 (0.27%)
Colusa	7,227	4,461 (61.72%)	2,743 (37.96%)	23 (0.32%)	- -	- -	23 (0.32%)

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Table 8B (Page 2 of 3)

**AVAILABILITY OF COMPETING BROADBAND PROVIDERS
OFFERING 25/3 BROADBAND ACCESS SERVICE
BY COUNTY
(As of December 2015, Ranked by competitive availability lowest to highest)**

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
Napa	49,281	3,981 (8.08%)	38,455 (78.03%)	6,722 (13.64%)	124 (0.25%)	- -	6,845 (13.89%)
Orange	1,012,422	27,304 (2.70%)	833,420 (82.32%)	151,329 (14.95%)	369 (0.04%)	- -	151,698 (14.98%)
Santa Clara	625,869	28,212 (4.51%)	496,808 (79.38%)	95,345 (15.23%)	5,442 (0.87%)	62 (0.01%)	100,848 (16.11%)
Yolo	71,300	12,360 (17.34%)	45,829 (64.28%)	12,592 (17.66%)	498 (0.70%)	21 (0.03%)	13,111 (18.39%)
Marin	103,645	3,407 (3.29%)	79,011 (76.23%)	20,598 (19.87%)	629 (0.61%)	- -	21,227 (20.48%)
Mendocino	35,522	11,504 (32.39%)	15,944 (44.89%)	8,073 (22.73%)	- -	- -	8,073 (22.73%)
Placer	138,060	33,505 (24.27%)	70,767 (51.26%)	32,784 (23.75%)	1,004 (0.73%)	- -	33,788 (24.47%)
STATEWIDE	12,830,035	751,555 (5.86%)	8,839,686 (68.90%)	3,037,259 (23.67%)	177,449 (1.38%)	24,087 (0.19%)	3,238,794 (25.24%)
Sacramento	521,639	24,294 (4.66%)	339,459 (65.08%)	141,534 (27.13%)	16,270 (3.12%)	81 (0.02%)	157,886 (30.27%)
Los Angeles	3,285,160	12,320 (0.38%)	2,255,473 (68.66%)	1,006,268 (30.63%)	11,098 (0.34%)	- -	1,017,367 (30.97%)
Santa Cruz	95,749	4,039 (4.22%)	59,977 (62.64%)	30,378 (31.73%)	1,346 (1.41%)	10 (0.01%)	31,734 (33.14%)
Contra Costa	382,883	9,236 (2.41%)	237,847 (62.12%)	114,227 (29.83%)	20,938 (5.47%)	635 (0.17%)	135,799 (35.47%)
Sonoma	188,528	9,720 (5.16%)	110,224 (58.47%)	66,291 (35.16%)	2,293 (1.22%)	- -	68,584 (36.38%)
Ventura	270,879	4,992 (1.84%)	160,962 (59.42%)	104,925 (38.74%)	- -	- -	104,925 (38.74%)
Alameda	554,954	13,442 (2.42%)	319,794 (57.63%)	212,667 (38.32%)	9,052 (1.63%)	- -	221,719 (39.95%)
San Mateo	261,284	5,797 (2.22%)	140,096 (53.62%)	86,041 (32.93%)	26,001 (9.95%)	3,350 (1.28%)	115,391 (44.16%)
San Bernardino	620,812	34,947 (5.63%)	305,052 (49.14%)	280,773 (45.23%)	39 (0.01%)	- -	280,812 (45.23%)
Riverside	706,222	22,065 (3.12%)	341,597 (48.37%)	339,495 (48.07%)	3,065 (0.43%)	- -	342,560 (48.51%)
San Francisco	364,363	875 (0.24%)	86,305 (23.69%)	180,853 (49.64%)	76,402 (20.97%)	19,928 (5.47%)	277,183 (76.07%)

Source: See notes from Table 8A.

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Table 8B (Page 2 of 3)

**AVAILABILITY OF COMPETING BROADBAND PROVIDERS
OFFERING 25/3 BROADBAND ACCESS SERVICE
BY COUNTY
(As of December 2015, Ranked by competitive availability lowest to highest)**

COUNTY	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
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Yolo	71,300	12,360 (17.34%)	45,829 (64.28%)	12,592 (17.66%)	498 (0.70%)	21 (0.03%)	13,111 (18.39%)
Marin	103,645	3,407 (3.29%)	79,011 (76.23%)	20,598 (19.87%)	629 (0.61%)	- -	21,227 (20.48%)
Mendocino	35,522	11,504 (32.39%)	15,944 (44.89%)	8,073 (22.73%)	- -	- -	8,073 (22.73%)
Placer	138,060	33,505 (24.27%)	70,767 (51.26%)	32,784 (23.75%)	1,004 (0.73%)	- -	33,788 (24.47%)
STATEWIDE	12,830,035	751,555 (5.86%)	8,839,686 (68.90%)	3,037,259 (23.67%)	177,449 (1.38%)	24,087 (0.19%)	3,238,794 (25.24%)
Sacramento	521,639	24,294 (4.66%)	339,459 (65.08%)	141,534 (27.13%)	16,270 (3.12%)	81 (0.02%)	157,886 (30.27%)
Los Angeles	3,285,160	12,320 (0.38%)	2,255,473 (68.66%)	1,006,268 (30.63%)	11,098 (0.34%)	- -	1,017,367 (30.97%)
Santa Cruz	95,749	4,039 (4.22%)	59,977 (62.64%)	30,378 (31.73%)	1,346 (1.41%)	10 (0.01%)	31,734 (33.14%)
Contra Costa	382,883	9,236 (2.41%)	237,847 (62.12%)	114,227 (29.83%)	20,938 (5.47%)	635 (0.17%)	135,799 (35.47%)
Sonoma	188,528	9,720 (5.16%)	110,224 (58.47%)	66,291 (35.16%)	2,293 (1.22%)	- -	68,584 (36.38%)
Ventura	270,879	4,992 (1.84%)	160,962 (59.42%)	104,925 (38.74%)	- -	- -	104,925 (38.74%)
Alameda	554,954	13,442 (2.42%)	319,794 (57.63%)	212,667 (38.32%)	9,052 (1.63%)	- -	221,719 (39.95%)
San Mateo	261,284	5,797 (2.22%)	140,096 (53.62%)	86,041 (32.93%)	26,001 (9.95%)	3,350 (1.28%)	115,391 (44.16%)
San Bernardino	620,812	34,947 (5.63%)	305,052 (49.14%)	280,773 (45.23%)	39 (0.01%)	- -	280,812 (45.23%)
Riverside	706,222	22,065 (3.12%)	341,597 (48.37%)	339,495 (48.07%)	3,065 (0.43%)	- -	342,560 (48.51%)
San Francisco	364,363	875 (0.24%)	86,305 (23.69%)	180,853 (49.64%)	76,402 (20.97%)	19,928 (5.47%)	277,183 (76.07%)

Source: See notes from Table 8A.

56. Of the total 58 counties in the state, 46 are designated as falling within Metropolitan Statistical Areas ("MSAs"). The largest MSAs are grouped into Consolidated Statistical Areas (CSAs). Table 9 below summarizes broadband availability separately for each of the 5 CSAs and larger MSAs, for all other MSAs (combined), and for all non-MSA counties (combined). Statewide, roughly 94.14% of all California households are able to obtain broadband access at the FCC 25/3 minimum speed level. However, only about 25.2% of all California households have a choice of two or more providers at the 25/3 level. The remaining 68.9% are left to deal with an unregulated monopoly for this essential service. Looking only at the largest metropolitan areas, 96.3% of households have access to 25/3 broadband, but only 28.9% have a choice of two or more providers. Across all 46 MSA counties, some 94.7% of households have access to 25/3 broadband, but 69.3% must still deal with a single unregulated monopoly for their broadband access. Across the remaining 12 non-MSA counties, the situation is considerably bleaker. First, only 25.3% of households in these counties are even being offered 25/3 broadband at all. And only 0.74% have any choice of service provider.

Table 9

AVAILABILITY OF COMPETING BROADBAND PROVIDERS OFFERING 25/3 BROADBAND ACCESS SERVICE IN PRINCIPAL METROPOLITAN AREAS

Area	Counties included	No. of Providers Total HHs	0 HHs (% of total)	1 HHs (% of total)	2 HHs (% of total)	3 HHs (% of total)	4 or more HHs (% of total)	HHs w/ At least One Competitive Choice
Los Angeles-Long Beach CSA	Los Angeles Orange San Bernadino Riverside Ventura	5,895,495	101,628 (1.72%)	3,896,504 (66.09%)	1,882,791 (31.94%)	14,572 (0.25%)	- -	1,897,363 (32.18%)
San Francisco-San Jose-Oakland CSA	San Francisco San Mateo Marin Alameda Contra Costa Santa Cruz Santa Clara San Beinto Solano Sonoma Napa	2,788,462	91,480 (3.28%)	1,706,727 (61.21%)	823,829 (29.54%)	142,441 (5.11%)	23,985 (0.86%)	990,254 (35.51%)
Sacramento CSA	Sacramento Placer Yolo El Dorado Sutter Yuba Nevada	899,829	111,253 (12.36%)	581,035 (64.57%)	189,667 (21.08%)	17,772 (1.98%)	102 (0.01%)	207,542 (23.06%)
San Diego MSA	San Diego	1,113,250	47,240 (4.24%)	984,579 (88.44%)	78,767 (7.08%)	2,664 (0.24%)	- -	81,430 (7.31%)
Fresno-Madera, CSA	Fresno Madera	344,084	56,013 (16.28%)	274,478 (79.77%)	13,594 (3.95%)	- -	- -	13,594 (3.95%)
Other MSAs	Kern San Joaquin Stanislaus Tulare Santa Barbara Monterey San Luis Obispo Merced Butte Shasta Imperial Kings Humboldt Mendocino Lake Tehama Tuolumne Lassen Del Norte Inyo	1,683,287	265,061 (15.75%)	1,370,399 (81.41%)	47,826 (2.84%)	- -	- -	47,826 (2.84%)
Non-MSA areas	Calaveras Siskiyou Amador Glenn Colusa Plumas Mariposa Mono Trinity Modoc Sierra Alpine	105,628	78,878 (74.68%)	25,964 (24.58%)	786 (0.74%)	- -	- -	786 (0.74%)
CSAs and Large MSAs		11,041,120	407,615 (3.69%)	7,443,323 (67.41%)	2,988,647 (27.07%)	177,449 (1.61%)	24,087 (0.22%)	3,190,183 (28.89%)
All MSAs		12,724,407	672,676 (5.29%)	8,813,722 (69.27%)	3,036,473 (23.86%)	177,449 (1.39%)	24,087 (0.19%)	3,238,009 (25.45%)
STATEWIDE		12,830,035	751,555 (5.86%)	8,839,686 (68.90%)	3,037,259 (23.67%)	177,449 (1.38%)	24,087 (0.19%)	3,238,794 (25.24%)

Source: See notes from Table 8A

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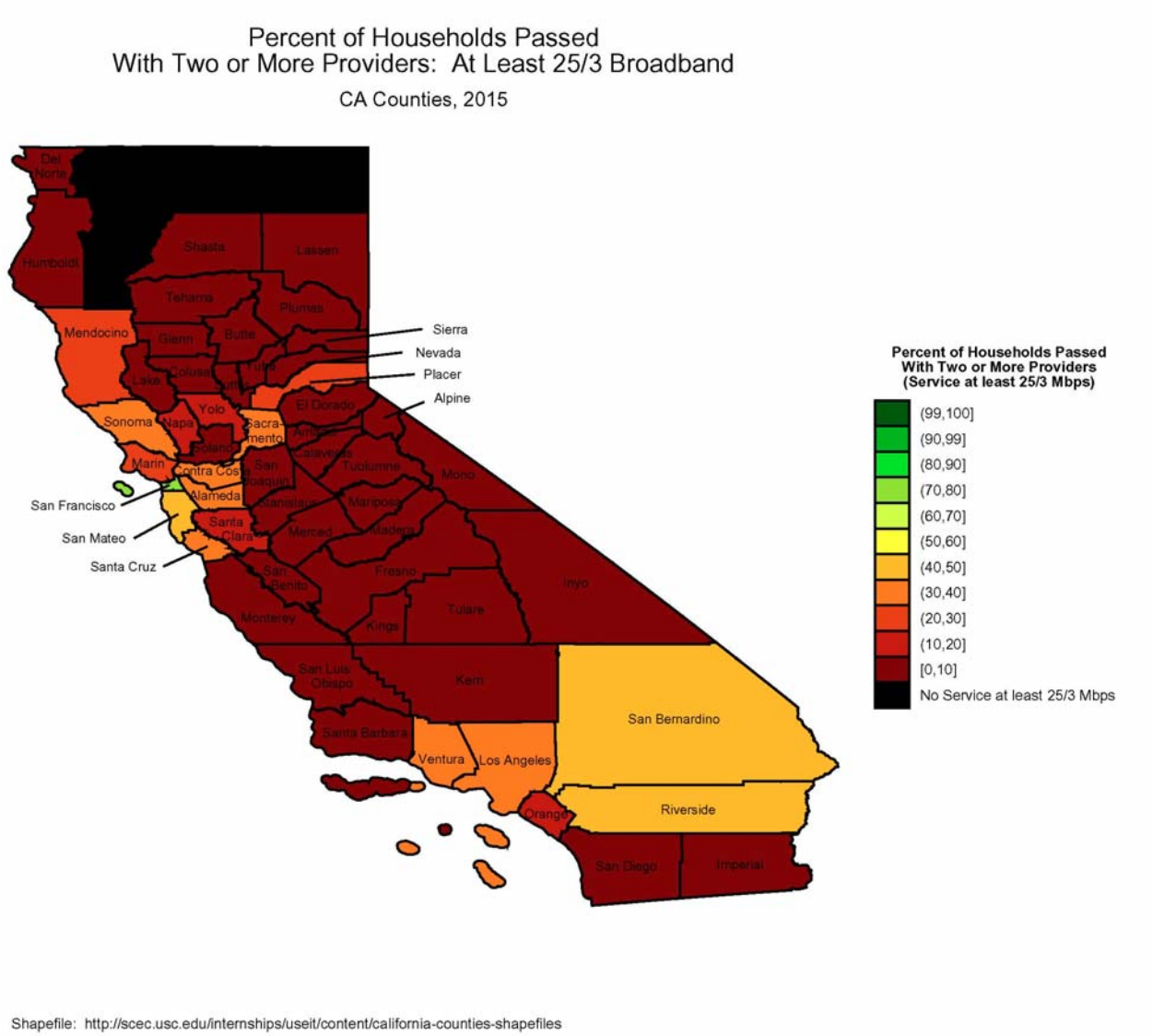

Shapefile: http://scec.usc.edu/internships/useit/content/california-counties-shapefiles

Figure 1. Availability of two or more Providers of 25/3 Broadband (by County)

Market concentration and market dominance

57. Data provided in response ti IR 6 by the principal facilities-based Respondents (AT&T, Frontier (Verizon), Comcast, TWC, Charter, Bright House, SureWest, and Cox, together with the Form 477 Broadband Availability Database regularly maintained by the Commission's Communications Division, support a detailed broadband market share and market concentration analysis based both on service availability and actual sales (subscriptions) for broadband services meeting the FCC's minimum definition of "broadband" – i.e., 25 Mbps in the download direction and 3 Mbps in the upload direction ("25/3"). I have performed separate analyses of market shares and market concentration ("HHI"), each based upon both availability and subscriptions. The HHI calculations based upon availability are calculated on an individual census block basis. However, because a number of Respondents have provided their subscriber counts only at the Census Tract level, the subscription-based HHIs were necessarily calculated on a Census Tract basis. Notably, in its May 2, 2016 Order regarding Business Data Services, the FCC indicates that it "consider[s] it unlikely that BDS supply in one part of an MSA would constrain the provision of BDS where it is demanded everywhere in the MSA" but also notes that there is "good evidence that the presence of fiber competition not only could be expected to impact, but actually can impact, supply of lower bandwidth services over the whole Census block in which that fiber is located.[39] The FCC also concludes that, in any event, "[t]he distances

39. *Business Data Services Order*, at para. 209.

competitive LECs are generally willing to extend their facilities to reach potential customers beyond the locations they currently reach are quite short."[40]

58. The competitive availability and market structure analyses and tabulations provided here are based upon a methodology that I had developed and applied in each of the three recent change-of-control proceedings in which I provided testimony on behalf of ORA. The current analyses differ from those in the prior proceedings in several important ways:

(1) The earlier work was based upon "broadband availability" data compiled and maintained by the Commission's Communications Division at a census block level. However, all households in any given census block were assumed to have broadband availability in any census block identified by the provider as being "passed" by its network. IR 6(c) requires that the Respondent provide actual counts of households passed, which may include less than all households in any given census block.

(2) Census block or census tract level subscription data was not available in the three earlier cases; here, responses to IR 6(b) provided that data, in some cases at a census block level and in other cases at a census tract level.

40. *Id.*, at para. 211.

(3) The prior analyses were limited to the providers at issue in those proceedings. The current analyses also cover AT&T and Cox, in addition to Comcast, post-merger Charter, and post-transaction Frontier. SureWest, now known as Consolidated Communications.

(4) The presence of subscription data in addition to availability data permits a more detailed market power analysis. Previously, I had calculated HHIs based upon availability. I have now been able to calculate additional HHIs based upon subscriptions. I have also developed a new measure of market power that I call the Market Dominance Index ("MDI" – discussed below) to provide an indication of the extent to which one or two firms in a geographic market with at least two service providers dominate a given geographic (census tract) market area.

59. Statistics regularly published by the FCC and by the CPUC focus upon the number of providers offering qualifying broadband (or other) service in each geographic area, such as a census block, census tract, county, or other geographic unit.[41] While useful, these simple "head counts" fail to disclose the relative size or strength of each of the identified providers. For example, no distinction is made as between a market with three providers each having a roughly equal share of customers vs. a market with three providers with shares of 80%, 15% and 5%, respectively, or one with three providers having shares of 45%, 45% and 10%, respectively. Yet

41. *In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 15-191, *2016 Broadband Progress Report*, FCC 16-6 (rel. January 29, 2016); *California Broadband Report: A Comparative Summary of Broadband Adoption for June 30, 2011 and June 30, 2012*, California Public Utilities Commission (CPUC), April 2014.

the extent to which incumbents in a market are capable of exercising market power will vary significantly among these three cases.

60. In a market characterized by relatively high Minimum Efficient Scale ("MES"), effective competition requires more than two incumbent providers. ETI's availability-based HHI calculations (as used in the three change-of-control Sec. 854 cases) were extremely conservative, in that they were based upon the assumption that the market was shared equally among all providers identified as having availability in any given census block. Thus, if service was available from two providers, the availability-based HHI calculation ascribed a 50% market share to each; if three providers offered service, the HHI calculation assumed that each held a 33.33% market share This assumption produced the lowest (mathematically) possible HHI. Information Request 6(b) required Respondents to furnish subscription data. Using this *subscription* data, subscription-based HHI calculations can be made, although probably at a less granular level than census blocks (e.g., census tracts). The extent to which market shares based upon actual *subscriptions* differ from the conservative equal shares assumption underlying the availability-based HHIs provides a useful indication as to the extent to which the market is dominated by one firm (in the case of a two-firm market) or by one or two firms (in the case of a market with three or more providers). Using the ratio of the subscription-based HHI to the availability-based HHI for each census block or census tract, I have developed and calculated what I call the Market Dominance Index, or MDI. The MDI is a measure of the deviation of actual market shares (based upon subscriptions) from the equal shares assumption underlying the availability-based HHIs. All else equal, the higher the MDI, the greater the degree of market

dominance present in the particular geographic (or product) market under examination. To the best of my knowledge, this quantitative approach to assessing the extent of market dominance has not been previously undertaken either by the FCC or by the CPUC.

61. Ideally, the MDI and the component HHIs upon which it is based should be calculated at the census block level. However, Frontier has indicated that it does not maintain data at this level of granularity, and have offered subscription data at the Census Block Group and Census Tract level only.[42] In order to develop competitive availability data for all major carriers statewide, it is necessary to apply the most granular data that is available from all respondents, and that would be at the Census Tract level. We can calculate an MDI for each Census Tract as follows:

- Aggregate individual Census Block data into their corresponding Census Tract;
- For each Census Tract, calculate Census Tract level HHIs separately for subscriptions and for households passed (availability).
- Calculate the MDI for each Census Tract with two or more providers by taking the ratio of the subscription-based HHI to the availability-based HHI for that Tract.
- Census tracts containing only one provider present a special case with respect to the calculation of the MDI. Here, both the subscriber- and availability-based HHIs will be equal to 10,000 (i.e., 100^2), implying an MDI of 1.0, which suggests that no firm in that geographic market is dominant. To address this anomalous result, we set the value of the MDI for any one-provider census tract at 2.0. 2.0 is the theoretical maximum MDI that would exist for any 2-provider market where all subscriptions are furnished by one

42. In response to IR 6, Frontier Communications claimed that it could not identify broadband subscriptions at the census block level. Instead, Frontier reported broadband subscriptions at the census block group (for former Verizon CA broadband services) and census tract level (for pre-transaction Frontier Communications broadband services).

provider and none by the other. For such a market, the subscription-based HHI would be 10,000 and the availability-based HHI would be 5,000, yielding an MDI of 2.0. This is the appropriate value to use when calculating weighted average MDIs for counties or other larger areas.

- Calculate a weighted average of Census Track-level MDIs for each major provider's total California footprint, so as to yield an overall measure of that provider's relative dominance across the California geographic markets that it serves. Exclude any census tract with only one provider.

62. Table 10 below illustrates the calculation of Census Tract MDI for several hypothetical cases. For example, suppose that in a given census tract there are two providers offering broadband service at 25/3 or greater. The availability-based HHI for that tract, which is based upon the most conservative assumption of equal shares for each of the providers, would be 5,000.[43] However, suppose that, based upon *subscriptions*, the market shares of the two carriers are found to be 70/30. The HHI corresponding to 70/30 would be 5800 – i.e., $70^2 + 30^2 = 4900 + 900 = 5800$. The MDI is then calculated as the ratio of 5800 to 5000, or 1.16. If the split were 80/20, the subscription-based HHI would be 6800 (i.e., $80^2 + 20^2 = 6400 + 400 = 6800$), resulting in an MDI of 1.36 (i.e., 6800 / 5000). The higher the MDI, the greater the relative dominance of one carrier. For a three-firm market, the minimum HHI is 3333, assuming a 33.33% share held by each. This is the figure that was assumed in the availability-based calculation. If actual shares (based upon subscriptions) was also 33.33% for each, the subscriber-based HHI would also be 3333, and the MDI would be 1.00. Suppose that based upon subscriptions, the shares

43. In a market with two firms, the availability-based HHI calculation is based upon an assumed 50/50 market share split. The HHI is thus calculated as $50^2 + 50^2 = 2500 + 2500 = 5000$. For a 3-firm market area, the availability-based HHI assumes that each firm has 33.33% of the market, resulting in an HHI of 3333. HHIs calculated based upon these "equal shares" assumptions produce the most conservative result – that is, any departure from an equal shares assumption will result in a higher HHI for that market.

Table 10

ILLUSTRATIVE CALCULATION OF MARKET DOMINANCE INDEX (MDI)

Example 1: 2 Providers	**Provider A**	**Provider B**		**HHI**
Assumed share of households passed (%)	50	50		5000
Actual Subscribers (500)	350	150		
Shares based on subscriptions (%)	70	30		5800
Market Dominance Index (MDI)				1.16
Example 2: 2 Providers	**Provider A**	**Provider B**		**HHI**
Assumed share of households passed (%)	50	50		5000
Actual Subscribers (500)	400	100		
Shares based on subscriptions (%)	80	20		6800
Market Dominance Index (MDI)				1.36
Example 3: 3 Providers	**Provider A**	**Provider B**	**Provider C**	**HHI**
Assumed share of households passed (%)	33.33	33.33	33.33	3333
Actual Subscribers (500)	250	200	50	
Shares based on subscriptions (%)	50	40	10	4200
Market Dominance Index (MDI)				1.26
Example 4: 3 Providers	**Provider A**	**Provider B**	**Provider C**	**HHI**
Assumed share of households passed (%)	33.33	33.33	33.33	3333
Actual Subscribers (500)	400	75	25	
Shares based on subscriptions (%)	80	15	5	6650
Market Dominance Index (MDI)				1.99

of the three firms are 50%, 40% and 10%. The subscription-based HHI for this would be 4200, resulting in an MDI of 1.26. If the market shares were 80%, 15% and 5%, the subscription-based HHI would be 6650, resulting in an MDI of 1.99. Thus, the more unequal the firms' shares are, the higher the MDI for the subject market. Even in highly concentrated markets, a

relatively low MDI would tend to suggest that the firms therein are competing aggressively to the point where their respective shares are equal. Where the MDI is significantly greater than 1.0, one can conclude that the market is dominated by one or by a very small number of firms, and that the competitive "fringe" is not successful either in gaining share or in constraining the market power of the dominant firm. By calculating MDIs in this manner, we can obtain a indication of the extent to which the presence of more than one firm in a given market is likely to make the market effectively competitive. Any census tract containing only a single provider is excluded from the MDI calculation, since the subscription- and availability-based HHIs for any such tract would each be 10,000, implying an MDI of 1.0.

63. Table 11 below provides a summary of availability- and subscription-based HHIs and corresponding MDIs for each of California's 58 counties. In Table 12 below, I have made corresponding calculations for each of the state's principal metropolitan areas (Los Angeles, San Francisco Bay Area, Sacramento, San Diego, and Fresno), other MSAs, and across all non-MSA areas. All areas of the state, from the most urban to the most rural, exhibit HHIs (for both availability and for subscriptions) that fall in the "highly concentrated" range. Moreover, with very few exceptions, the MDI indicates significant and in some cases near total market dominance by a single firm. In the handful of locations where three or more firms offer 25/3 broadband, the smaller firm(s) is(are) little more than fringe competitors, offering no serious challenge or other competitive discipline to their dominant rival(s). Any contention or suggestion that the provision of broadband services to residential customers in California would even remotely resemble "competitive" market conditions is pure fantasy.

Table 11A (Page 1 of 2)

COUNTY-LEVEL HHIs AND MDIs
FOR 25/3 BROADBAND ACCESS SERVICE
(As of December 2015, Alphabetical Order)

County	Total HHs	Total HHs 25/3 Availability	Subscription HHI	Availability HHI	MDI
Alameda	554,954	541,512	8,346	7,925	1.229
Alpine	501	47	10,000	10,000	2.000
Amador	14,686	4,093	9,787	9,985	1.342
Butte	89,398	78,630	10,000	10,000	1.914
Calaveras	19,135	13,224	9,553	9,752	1.474
Colusa	7,227	2,766	10,000	9,958	1.357
Contra Costa	382,883	373,647	8,456	8,085	1.235
Del Norte	9,974	9,363	10,000	10,000	1.833
El Dorado	70,822	53,507	9,997	9,933	1.577
Fresno	299,452	260,289	9,944	9,776	1.283
Glenn	10,020	6,388	10,000	9,925	1.390
Humboldt	56,060	43,804	9,925	9,979	1.781
Imperial	49,792	43,134	10,000	10,000	1.901
Inyo	8,068	6,352	9,979	10,000	1.699
Kern	262,965	233,743	9,984	9,832	1.308
Kings	42,259	34,455	9,994	9,731	1.247
Lake	27,491	22,971	10,000	10,000	1.892
Lassen	10,073	5,410	9,976	10,000	1.828
Los Angeles	3,285,160	3,272,840	8,113	8,440	1.179
Madera	44,632	27,782	9,987	9,650	1.155
Marin	103,645	100,238	9,252	8,931	1.227
Mariposa	7,873	49	10,000	10,000	2.000
Mendocino	35,522	24,018	8,007	8,319	1.502
Merced	77,041	63,431	9,892	9,711	1.209
Modoc	4,105	-	-		
Mono	5,816	157	10,000	10,000	2.000
Monterey	126,025	92,670	9,923	9,771	1.210
Napa	49,281	45,300	9,314	9,240	1.086
Nevada	41,181	26,436	9,878	9,932	1.564

Table 11A (Page 2 of 2)

**COUNTY-LEVEL HHIs AND MDIs
FOR 25/3 BROADBAND ACCESS SERVICE
(As of December 2015, Alphabetical Order)**

County	Total HHs	Total HHs 25/3 Availability	Subscription HHI	Availability HHI	MDI
Orange	1,012,422	985,118	9,097	9,229	1.182
Placer	138,060	104,555	8,203	8,368	1.206
Plumas	9,078	-	-		
Riverside	706,222	684,157	6,744	7,489	1.122
Sacramento	521,639	497,345	9,051	8,358	1.216
San Benito	17,176	14,489	9,958	9,858	1.279
San Bernardino	620,812	585,865	6,741	7,603	1.129
San Diego	1,113,250	1,066,010	9,697	9,614	1.091
San Francisco	364,363	363,488	6,556	5,708	1.524
San Joaquin	220,294	203,215	9,985	9,798	1.274
San Luis Obispo	104,973	95,085	9,902	9,985	1.925
San Mateo	261,284	255,487	7,975	7,539	1.291
Santa Barbara	144,371	135,713	9,332	9,946	1.732
Santa Clara	625,869	597,657	9,361	9,141	1.155
Santa Cruz	95,749	91,710	8,250	8,245	1.156
Shasta	71,582	53,472	9,997	9,997	1.869
Sierra	1,487	25	-	10,000	
Siskiyou	19,569	-	-		
Solano	144,730	134,644	9,731	9,607	1.112
Sonoma	188,528	178,808	8,289	8,061	1.171
Stanislaus	166,438	155,759	9,761	9,763	1.102
Sutter	31,404	28,304	9,995	9,889	1.185
Tehama	24,082	12,258	10,000	10,000	1.681
Trinity	6,131	-	-		
Tulare	134,612	89,001	9,974	9,745	1.215
Tuolumne	22,267	15,743	10,000	10,000	2.000
Ventura	270,879	265,887	7,549	8,027	1.164
Yolo	71,300	58,940	8,446	8,873	1.006
Yuba	25,423	19,488	9,989	9,730	1.233
STATEWIDE	12,830,035	12,078,480	8,474	8,630	1.223

Source: Respondent submissions relating to IRs 6(a), 6(b), and 6(e) as of 12/31/2015. Data relating to other providers was obtained from FCC Form 477 Data as of 06/30/2015. Note that number of households passed is based upon 2015 Census Bureau Data because Respondents did not provide consistent and comparable data for number of households passed. Additionally, Frontier CA (formerly Verizon CA) subscriptions in each census tract are based upon Frontier CA average take rate for service at 25/3 or higher. For smaller (non-Respondent) providers, the number of subscriptions is based upon the number of households in each census tract and a 5% take rate for service at 25/3 or higher.

Table 11B (Page 1 of 2)

COUNTY-LEVEL HHIs AND MDIs
FOR 25/3 BROADBAND ACCESS SERVICE
(As of December 2015, Ranked by MDI highest to lowest)

County	Total HHs	Total HHs 25/3 Availability	Subscription HHI	Availability HHI	MDI
Modoc	4,105	-	-		
Plumas	9,078	-	-		
Sierra	1,487	25	-	10,000	
Siskiyou	19,569	-	-		
Trinity	6,131	-	-		
Alpine	501	47	10,000	10,000	2.000
Mariposa	7,873	49	10,000	10,000	2.000
Mono	5,816	157	10,000	10,000	2.000
Tuolumne	22,267	15,743	10,000	10,000	2.000
San Luis Obispo	104,973	95,085	9,902	9,985	1.925
Butte	89,398	78,630	10,000	10,000	1.914
Imperial	49,792	43,134	10,000	10,000	1.901
Lake	27,491	22,971	10,000	10,000	1.892
Shasta	71,582	53,472	9,997	9,997	1.869
Del Norte	9,974	9,363	10,000	10,000	1.833
Lassen	10,073	5,410	9,976	10,000	1.828
Humboldt	56,060	43,804	9,925	9,979	1.781
Santa Barbara	144,371	135,713	9,332	9,946	1.732
Inyo	8,068	6,352	9,979	10,000	1.699
Tehama	24,082	12,258	10,000	10,000	1.681
El Dorado	70,822	53,507	9,997	9,933	1.577
Nevada	41,181	26,436	9,878	9,932	1.564
San Francisco	364,363	363,488	6,556	5,708	1.524
Mendocino	35,522	24,018	8,007	8,319	1.502
Calaveras	19,135	13,224	9,553	9,752	1.474
Glenn	10,020	6,388	10,000	9,925	1.390
Colusa	7,227	2,766	10,000	9,958	1.357
Amador	14,686	4,093	9,787	9,985	1.342
Kern	262,965	233,743	9,984	9,832	1.308

Table 11B (Page 2 of 2)

COUNTY-LEVEL HHIs AND MDIs
FOR 25/3 BROADBAND ACCESS SERVICE
(As of December 2015, Ranked by MDI highest to lowest)

County	Total HHs	Total HHs 25/3 Availability	Subscription HHI	Availability HHI	MDI
San Mateo	261,284	255,487	7,975	7,539	1.291
Fresno	299,452	260,289	9,944	9,776	1.283
San Benito	17,176	14,489	9,958	9,858	1.279
San Joaquin	220,294	203,215	9,985	9,798	1.274
Kings	42,259	34,455	9,994	9,731	1.247
Contra Costa	382,883	373,647	8,456	8,085	1.235
Yuba	25,423	19,488	9,989	9,730	1.233
Alameda	554,954	541,512	8,346	7,925	1.229
Marin	103,645	100,238	9,252	8,931	1.227
STATEWIDE	12,830,035	12,078,480	8,474	8,630	1.223
Sacramento	521,639	497,345	9,051	8,358	1.216
Tulare	134,612	89,001	9,974	9,745	1.215
Monterey	126,025	92,670	9,923	9,771	1.210
Merced	77,041	63,431	9,892	9,711	1.209
Placer	138,060	104,555	8,203	8,368	1.206
Sutter	31,404	28,304	9,995	9,889	1.185
Orange	1,012,422	985,118	9,097	9,229	1.182
Los Angeles	3,285,160	3,272,840	8,113	8,440	1.179
Sonoma	188,528	178,808	8,289	8,061	1.171
Ventura	270,879	265,887	7,549	8,027	1.164
Santa Cruz	95,749	91,710	8,250	8,245	1.156
Madera	44,632	27,782	9,987	9,650	1.155
Santa Clara	625,869	597,657	9,361	9,141	1.155
San Bernardino	620,812	585,865	6,741	7,603	1.129
Riverside	706,222	684,157	6,744	7,489	1.122
Solano	144,730	134,644	9,731	9,607	1.112
Stanislaus	166,438	155,759	9,761	9,763	1.102
San Diego	1,113,250	1,066,010	9,697	9,614	1.091
Napa	49,281	45,300	9,314	9,240	1.086
Yolo	71,300	58,940	8,446	8,873	1.006

Source: See Table 11A.

Table 12

METROPOLITAN AREA HHIs AND MDIs FOR 25/3 BROADBAND ACCESS SERVICE

Area	Counties Included	Total HHs	Total HHs 25/3 Availability	Subscription HHI	Availability HHI	MDI
Los Angeles-Long Beach CSA	Los Angeles Orange San Bernadino Riverside Ventura	5,895,495	5,793,867	7,961	8,358	1.167
San Francisco-San Jose-Oakland CSA	San Francisco San Mateo Marin Alameda Contra Costa Santa Cruz Santa Clara San Beinto Solano Sonoma Napa	2,788,462	2,696,982	8,405	8,056	1.243
Sacramento CSA	Sacramento Placer Yolo El Dorado Sutter Yuba Nevada	899,829	788,576	9,079	8,646	1.240
San Diego MSA	San Diego	1,113,250	1,066,010	9,697	9,614	1.091
Fresno-Madera, CSA	Fresno Madera	344,084	288,071	9,948	9,764	1.270
Other MSAs	Kern San Joaquin Stanislaus Tulare Santa Barbara Monterey San Luis Obispo Merced Butte Shasta Imperial Kings Humboldt Mendocino Lake Tehama Tuolumne Lassen Del Norte Inyo	1,683,287	1,418,226	9,818	9,831	1.467
Non-MSA areas	Calaveras Siskiyou Amador Glenn Colusa Plumas Mariposa Mono Trinity Modoc Sierra Alpine	105,628	26,750	9,663	9,853	1.493
CSAs and Large MSAs		11,041,120	10,633,505	8,334	8,467	1.187
All MSAs		12,724,407	12,051,731	8,471	8,628	1.222
STATEWIDE		12,830,035	12,078,480	8,446	8,630	1.223

Source: See Table 11A

64. Table 13 below provides the same types of HHI and MDI calculations as in Tables 7 through 10, but for the respective geographic footprints being served by each of California's six principal broadband service providers – Comcast, Charter (which now includes the former TWC and Bright House service areas), Cox, AT&T, and Frontier (which now includes the former Verizon California service area). In each case, the providers' respective service areas present HHIs indicative of a highly concentrated market, and MDIs indicative of overwhelming market dominance by one or at most two incumbents. None of the six major broadband providers can be said to confront any meaningful competition for these services anywhere in the state.

Table 13

TOTAL SERVICE AREA HHIs AND MDIs FOR EACH MAJOR BROADBAND PROVIDER OF 25/3 BROADBAND ACCESS SERVICE

Provider (1)	Total HHs with 25/3 availability from any provider in Footprint (2)	Total HHs with 25/3 availability from the indicated provider 2015 Census Data (3)	Total HHs with 25/3 availability from the indicated provider (4)	Total Subs. with 25/3 in Footprint (5)	Provider 25/3 Subscribers (6)	Subscription HHI (7)	Availability HHI (8)	MDI (9)
AT&T						9,507	9,053	1.22
Charter (incl TWC, BHN)						8,120	8,489	1.19
Comcast						9,397	8,502	1.26
Consolidated (SureWest)						8,592	6,266	1.47
Cox						9,518	9,552	1.22
Frontier (incl Verizon)						7,001	7,019	1.22

Sources: Respondent submissions relating to IRs 6(a), 6(b), and 6(e) as of 12/31/2015. Data relating to other providers was obtained from FCC Form 477 Data as of 06/30/2015. Note that Col. (3) is based upon the number of households passed as provided in 2015 Census Bureau Data (with the exception of Charter) because Respondents did not provide consistent and comparable data for households passed. For Charter, Col. (3) is based upon the sum of the reported total HHs passed by individual Respondents Charter, TWC, and BHN. Col. (4) presents the HHs passed as reported by Respondents, but this data was not consistent or comparable, and was not used in this analysis. For Consolidated, Cox, and Frontier/Verizon CA, which did not provide detailed data on HHs passed; Col. (3) figures were inserted. Additionally, Frontier CA (formerly Verizon CA) subscriptions in each census tract are based upon Frontier CA average take rate for service 25/3 or higher. For smaller (non-Respondent) providers, the number of subscriptions is based upon the number of households in each census tract and an estimate of the small provider take rate derived from an analysis of census blocks with and without small provider presence. A figure of 5% was used, which likely overstates the actual take rate for these providers, and is therefore conservative for purposes of this analysis. The non-availability of subscription counts at the census block level (as requested in the OII) likely results in an understatement of the Subscriber HHI and MDI.

Note that the HHI and MDI figures refer to the geographic area constituting each provider's *footprint*, not to the relative market dominance of the provider itself. For example, AT&T, whose *U-Verse* service is based upon DSL technology, is not at present a consequential player in

the 25/3 broadband market. Although the 25/3 market within the area served by AT&T is highly concentrated and dominated by a single firm, that firm is *not* AT&T. Note also that to the extent that any one provider's footprint may overlap portions of several others (e.g., AT&T's operating areas overlap areas being served by Comcast, Charter and Cox), there may be several "dominant" firms, but to the extent that these do not themselves overlap each other, there would be only a single dominant firm in any given community within the AT&T footprint.

65. The market share, HHI and MDI calculations presented in Tables 7 through 11 are limited to *wireline* broadband services and service providers. While wireless broadband providers claim to offer service across a large number of census blocks in California, their actual "take rate" is extremely low.[44] In its May 2, 2016 Business Data Services Order, the FCC has largely dismissed the significance of wireless broadband as offering any serious competitive challenge to wireline:

> The viability of fixed wireless to provide last-mile access to end users, especially in urban areas, however, is the subject of debate. TDS conducted wireless last-mile access trials and found the technology "insufficient to meet consumers' needs for bandwidth and reliability." Level 3 states that fixed wireless "services are subject to well-known limitations, including line-of-sight restrictions and limited range" and "[b]ecause of these limitations, these services generally do not offer the level of speed and reliability that Level 3's customers demand." XO Communications, LLC (XO) states, however, that "[i]n some instances, [a] limited fixed wireless offering can substitute for a standalone wired connection"

44. "Today, cable modem service is the most common fixed broadband service in the United States, accounting for approximately 59 percent of all fixed broadband service subscriptions. Wired services, including cable, DSL, and fiber, collectively represent approximately 97 percent of the fixed broadband market. While there are fixed broadband services that connect users to the Internet using wireless transmission pathways, such as fixed satellite and fixed wireless service, they are adopted by less than three percent of residential fixed broadband subscribers" (footnotes omitted), FCC *2016 Broadband Progress Report*, at para. 26..

> but notes there are often limitations with fixed wireless, "including congestion, interference, rain fade, and need for line-of-sight, depending on the technology and frequencies used." In contrast, incumbent LEC commenters point to the fixed wireless efforts of Windstream Services, LLC (Windstream), XO and other providers as examples of its viability. Clearly, not all wireless services are the same and the capabilities can vary significantly depending on the frequency band utilized with higher frequencies providing more line-of-sight and other operational challenges.[45]

Market Conduct

66. Several elements of the S-C-P Paradigm address the *conduct* of firms in the market. As noted above (and by Dr. Katz for AT&T), market share and market concentration data by itself neither establishes nor disproves that the level of competition extant in a given product /geographic market is sufficient to assure a competitive outcome and support the reliance upon marketplace forces to constrain prices and protect consumers from monopoly abuses. However, together with an examination of the actual conduct of firms in a market characterized by high market shares and high levels of market concentration can offer a good indication as to the presence or absence of market failure. Among the more relevant conduct-related principles are the following:

(5) Putatively competing services may not offer fully equivalent functionality in all respects.

(9) Persistently excessive earnings levels of the dominant firm or firms are an indication of a lack of effective competition.

45. *Business Data Services Order*, at para. 69, citations omitted.

(11) Competitor dependence upon "essential" inputs from an upstream provider with substantial market power can undermine the effectiveness of competition, especially if the upstream provider is itself involved in the same downstream market.

(12) Persistent refusal on the part of a facilities-based service provider to deal with downstream entities is itself compelling evidence of that provider's market power.

(17) Persistent service quality and customer service issues may suggest a lack of effective competition.

Comparability of putatively competitive services

67. As I have previously discussed (in paras. 13-25), a determination as to whether two (or more) facially similar services are sufficiently close substitutes as to place them within the same product market is a complex undertaking that cannot be oversimplified or be considered substitutes merely because some, but less than all, customers view them as such. In particular, it is important to determine whether the purported substitutability of the two candidate services is symmetric. If a substantial share of customers do not perceive their wireless phone as a substitute or replacement for their wireline phone, their demand for wireline service may remain relatively price-inelastic even if the total market demand for wireless is not. As I noted above, close to two-thirds of households that have one or more wireless phones still retain their wireline service, a strong indication that these consumers do not view wireless as a close substitute for wireline service. Confronted with this pattern of demand, wireline carriers are in a position to raise wireline prices while still retaining large portions of their existing wireline customers, *and indeed have been doing precisely that*, as I have illustrated earlier in Table 7. The fact that wireline price levels have been rising while wireless prices have been falling (see Figure 2

below) confirms the existence of this market condition, and belies the conclusion that Dr. Katz and AT&T want the Commission to reach – i.e., that the presence of wireless service means that wireline voice service is being offered in an effectively competitive market. This gross oversimplification clearly ignores the reality that large numbers of consumers still view wireline service as a necessity that is not diminished im importance by the existence of wireless, that the ILECs and cable MSOs are well aware of the importance that this large fraction of households ascribe to wireline voice service, and have been specifically exploiting that dependence over most of the period since wireline voice service has been detariffed in California.

Earnings and Pricing

68. In effectively (although not necessarily perfectly) competitive markets, firms are generally unable to achieve *and to sustain* earnings level that are materially in excess of economic cost. Should this occur, other competitors will reduce their prices so as to capture additional market share, and/or new firms will enter the market, thereby bidding prices down toward cost. Under traditional cost-based rate-of-return regulation, the CPUC would affirmatively authorize the utility to set its rates so as to earn no more than a "fair return" on its investment – i.e., to maintain a level of accounting profits that eliminated monopoly or "economic" profits. Even in the absence of such rate-of-return regulation, the Commission could, in theory, monitor the earnings levels of firms under its jurisdiction to ascertain whether earnings levels are materially in excess of the "fair return" standard and, if so, conclude that competition is insufficiently effective to constrain prices to something approaching zero economic profits.

69. Deregulation of prices and earnings has enabled firms formerly subject to rate-of-return type regulation to increase their earnings above what would have been allowed under regulation, and thereby to increase their capitalized market value. For example, most of Verizon California's services were detariffed beginning around 2008 and Verizon succeeded in steadily increasing its monthly rates for the formerly-price-regulated services without having to provide any specific cost justification for such increases. In 2015, Verizon was able to monetize the increase in the value of these ILEC assets when it agreed to sell its local telephone business in California, Texas and Florida to Frontier for a price that was well in excess of the book value of its assets. Under traditional regulation, prices and earnings levels would have been driven by the Company's net book value, resulting in a market value of the business that would have been close to the firm's net book value. Under deregulation, the market value of the firm is driven by the net present value of the stream of future earnings. To the extent that such earnings include economic (supracompetitive) profits, their net present value will exceed the net book value of the firm.

70. The size of the gap between market value of the utility's stock and its net book value provides evidence of the extent to which the firm is able to exploit its market power. This is not to suggest that the goal of regulation should necessarily be to eliminate or even to diminish that gap; indeed, one of the primary tenets of the various regulatory reforms that were initiated in the late 1980s was to provide the regulated firm with an opportunity to improve its overall efficiency and to reward it for such gains. However, an escalating gap between book and market value is consistent with ongoing exercise of market power and the imposition of excessive prices in those

segments of the firm's business where minimal or no actual competition is present. Ongoing monitoring of dominant firms' financial results will be useful in helping to identify specific situations where regulatory intervention may be appropriate.

71. Unfortunately, we no longer have the detailed revenue, cost and earnings data for the principal telecommunications service providers that had been available in the past. The Commission should consider expanding its existing financial reporting requirements, including requiring segment-specific reports for areas where the Commission maintains regulatory authority, in order to support the ongoing monitoring that should be pursued.

72. The pricing results also confirm the presence of several distinct product markets. In its Business Data Services Order, the FCC observed that "[i]f two readily available services have substantially different prices, then they are likely dissimilar (otherwise buyers would prefer the cheaper service which would constrain the price of the other service)."[46] If wireline and wireless voice services were both in the same relevant *product* market, then over time we would expect the *relationship* between wireline and wireless prices to remain relatively stable, i.e., that price movements as between the two categories of service should be similar. However, it appears that this is not the case. Wireline residential price levels have remained steady or have actually increased somewhat over the past decade, whereas wireless price levels – particularly when adjusted for changes in the nature and quantity of services that are included within the basic monthly recurring charge for wireless service, have been dropping steadily. Wireless voice

46. *Business Data Services Order*, at para. 192.

block-of-time plans with specified minutes of use have evolved into unlimited flat-rate voice plans; during this transition, the number of minutes included in block-of-time plans increased, and various categories of voice minutes began to be offered on a no-charge basis, such as for calls placed between subscribers to the same carrier, and off-peak evening, night and weekend calling. Text messages, which were initially charge on a per-message basis, evolved first into usage block pricing arrangements, no-charge texting within the same carrier network, and ultimately into unlimited use plans. Wireless broadband data similarly evolved both with respect to speed as well as cumulative bandwidth usage during a given billing cycle. For those elements of wireless service that continue to be subject to volume-based pricing or usage caps, month-to-month "rollover" arrangements were introduced by several carriers. Overall, the effect of these changes in the nature of wireless service have produced a steady and substantial reduction in wireless price levels. Figure 2 below compares basic wireline and wireless price levels over the period 2006 through 2015, and illustrates the extreme divergence in price movements for these two services.

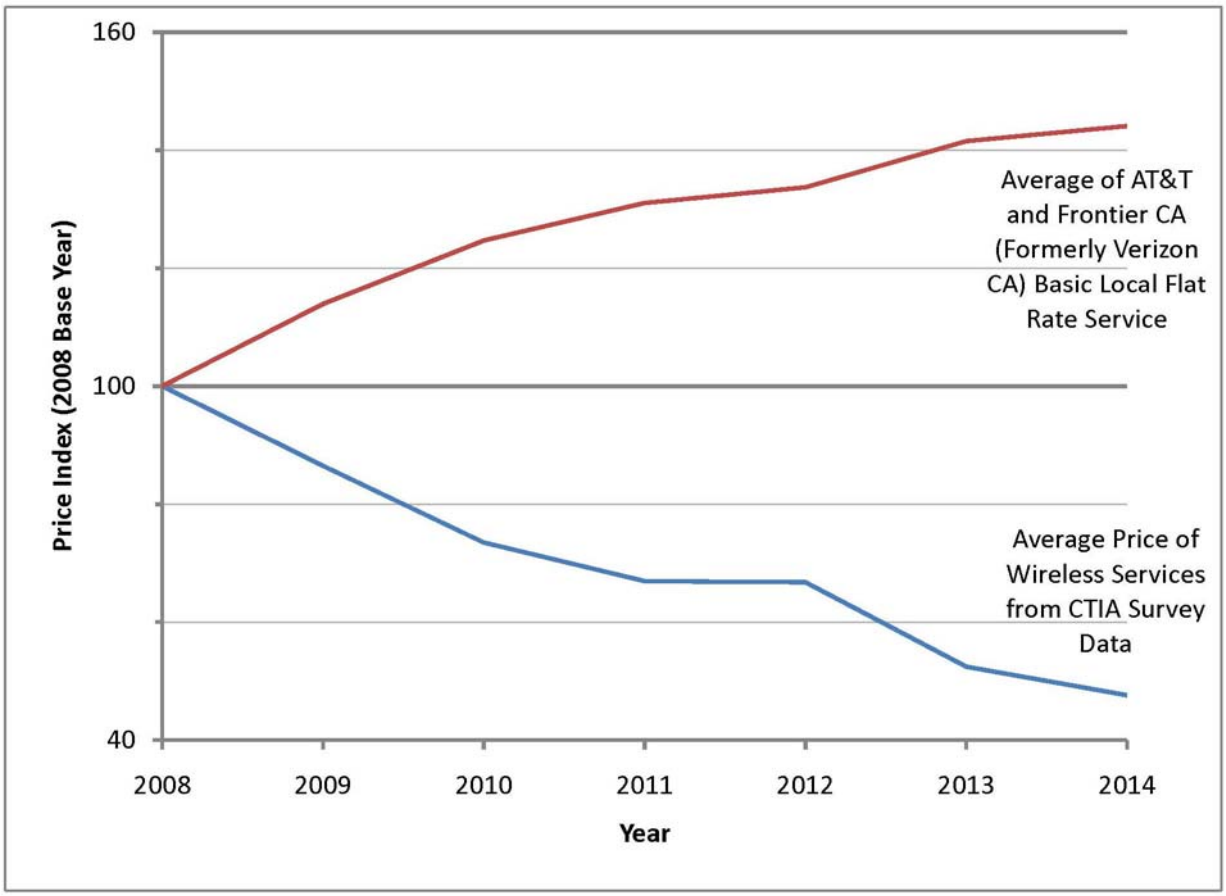

Figure 2. Wireline ILEC basic local exchange service rates have been steadily increasing at the same time that wireless rates have dropped by roughly 50%.

73. The extreme market concentration and market dominance extant in the 25/3 broadband market is present in every part of the state, as shown inTables 7 through 11. One would expect, given the absence of any meaningful competition for this service anywhere in California, that prices would be stable or be steadily increasing over time. And indeed, that is precisely what has been happening, as documented in Table 14 below (also shown graphically in Figure 3 below). Technological improvements over the past decade have led to major gains in broadband data

rates. In 2010, the FCC adopted a benchmark transmission speed for residential broadband of 4 Mbps down and 1 Mbps up.[47] Yet just five years later, the FCC increased its minimum standard for consumer broadband to 25/3.[48] These same technological gains have driven down prices for PCs, laptops, tablets and smartphones, while driving their respective speeds and storage capacities up, by at least a full order-of-magnitude or more over the decade. But while broadband speeds have experienced similar gains, broadband prices have continued to escalate. Clearly, the competitive forces that have brought down the costs and prices of digital *hardware* have not been operative in the case of broadband Internet access service.

47. FCC, *Connecting America : The National Broadband Plan*, March 17, 2010, at 135.

48. FCC, *2015 Broadband Progress Report*, at 3.

FIGURE 3 HAS BEEN REDACTED

TABLE 14 HAS BEEN REDACTED

74. ILEC and cable MSO price movements are thus consistent with a noncompetitive market. Prices for these companies' facilities-based services have either risen steadily or have not decreased by anywhere as much as those for facially similar voice and broadband services – services that the ILEC and MSO Respondents persist in claiming compete with their own offerings.

Competing retail provider dependence upon wholesale facilities-based services

75. From the outset of the liberalization of competition in telecommunications markets, policymakers recognized that entrants would not be able to replicate the core infrastructure of the incumbent local and long distance carriers, and that eliminating *legal* barriers to entry would not be sufficient by itself to bring about competition in core telecommunications markets. The federal *Telecommunications Act of 1996* ("*TA96*" or "*96 Act*") expressly *required* that ILECs offer services at wholesale for resale by retail service providers, and that unbundled network elements ("UNEs") be available at incremental cost-based rates to competitive local carriers. Earlier FCC decisions, reinforced by the 1984 consent decree that ended the Department of Justice 1974 antitrust case against AT&T Corp., had required Bell Operating Companies and other ILECs to furnish switched and special access services to all interexchange carriers on a nondiscriminatory basis.

76. Internet and IP technology have created enormous opportunities for new entrants at the "application" layer (as distinct from the physical, network or transport layers), but much of that activity is utterly dependent upon gaining access to fixed broadband subscribers. The ability of

potential competitors to gain access to an incumbent provider's network enables competition at the *retail* level even where replication of the underlying network is economically impractical or impossible. However, from the perspective of the facilities-based provider, such retail-level competition diverts revenue that would otherwise be available to the incumbent, thus reducing its overall return on its facilities interment. Not surprisingly, facilities-based carriers have long resisted requirements that they furnish wholesale services or element-level access to their core networks. In opposing "net neutrality" and in seeking to overturn the FCC's *Open Internet Order*, the incumbent LECs and incumbent cable MSOs have demonstrated their intent to exploit their market power with respect to residential broadband to the maximum extent possible. Where the underlying facilities-based provider has market power, it will engage in such wholesale transactions only to the extent compelled to do so by law or regulation.

77. The FCC has just released a massive Order dealing with this issue insofar as it affects special access services, now being more generally referred to as Business Data Services. I shall be discussing the FCC's *Business Data Services Order* in detail in responding to IR11 below. However, despite the business services focus of the Commission's May 2, 2016 ruling, the core principles dealing with pricing and availability of wholesale services, the identification of markets as "competitive" or "noncompetitive," and potential remedial measures that may be considered with respect to market failure regarding these services is equally applicable to a broad range of facilities-based carriers and services, including those targeted at mass market consumers. Therefore, the extensive discussion of the business services market that appears

below in response to IR11 also applies with respect to basic residential voice and broadband services.

Refusal to deal

78. ILECs are required, pursuant to Secs. 251 and 252 of the *Telecommunications Act of 1996*, to provide competitors with access to ILEC network facilities either on an unbundled basis[49] or for "total service resale"[50] by the competitor. Cable MSOs are under no such obligation. In 2002, the FCC issued its *Cable Modem Declaratory Ruling* classifying cable broadband services as Information Services subject to Title I of the *Communications Act of 1934*, as amended.[51] As Title I "information services" providers and *not* Title II telecommunications common carriers, cable MSOs were not subject to Secs. 251/252. In 2015, the FCC's *Open Internet Order*[52] reclassified cable broadband Internet access as a Title II telecommunications service and made their providers subject to Title II common carrier status, but expressly forebore from subjecting cable MSOs to most common carrier requirements, including in particular the various unbundling and wholesale services requirements of Secs. 251

49. 47 U.S.C. §251(c)(3); 47 U.S.C. §252(d)(1).

50. 47 U.S.C. §251(c)(4); 47 U.S.C. §252(d)(3).

51. *Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, Declaratory Ruling and Notice of Proposed Rulemaking*, 17 F.C.C.R. 4798 (2002) [*Cable Modem Declaratory Ruling*], *aff'd sub nom. Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967 (2005).

52. *Protecting and Promoting the Open Internet*, FCC GN Docket No. 14-28, *Report and Order on Remand, Declaratory Ruling, and Order*, Adopted: Feb. 26, 2015; Rel: March 12, 2015, FCC 15-24 ("*Open Internet Order*").

and 252.[53] Importantly, although not *required* to provide broadband services either on an unbundled or a wholesale basis to retail Internet access (and perhaps other) competitors, neither the statute nor any FCC regulations would *prohibit* cable MSOs from entering into such wholesale and/or unbundled services arrangements with rivals. IR 14(c) asked all *ILEC* respondents to "report the total access lines and other last-mile facilities which you provide to competitive carriers in California" but did not ask for similar information from any *non-ILEC* Respondent, in particular, from Respondents that were affiliates of cable MSOs. However, several data requests propounded by ORA to the Joint Applicants in the recent Charter/TWC/ Bright House merger proceeding (A.15-07-009) sought similar information on those carriers' wholesale services. The Charter and TWC responses to those ORA Data Requests did not include any last-mile wholesale voice or broadband access services that were being offered to competing *residential* service providers in California.[54] By engaging in such "refusal to deal," the cable MSOs are protecting their *retail-level* market while denying customers the opportunity to shop for potentially lower priced alternatives that utilize the same MSO infrastructure as the MSO itself. Persistent refusals to deal are consistent with high market concentration and market power on the part of the incumbent service providers.

79. ILECs also engage in similar refusal to deal policies, although somewhat constrained by the specific requirements of Secs. 251/252. Indeed, almost since initial adoption of the *1996 Act*, ILECs have been actively seeking to limit the scope of their unbundling and wholesale services

53. *Id.*, at para. 203.

54. A. 15-07-009, Charter and TWC Confidential Responses to ORA Data Request 1-59.

obligations. In 2004, these efforts resulted in the *USTA II* ruling by the D. C. Circuit that eliminated the requirement to provide so-called Unbundled Network Element Platform ("UNE-P") services to competing carriers at rates based upon incremental cost.[55]

80. By contrast, wireless carriers voluntarily offer wholesale services to competing retail service providers, including the facilitation of extended area coverage for regional carriers and "private label" coverage for competing providers. Although also highly concentrated, wireless markets are far more competitive than the wireline markets being served by their ILEC and MSO counterparts. Willingness to offer wholesale services is consistent with a more competitive market condition, since it enables each of the facilities-based incumbents to leverage their overall retail market reach by utilizing the retail distribution resources of other providers.

IR11. How and to what extent is competition in the business market different from that in the residential market?

81. The "business telecommunications market" covers a very broad range of business customers with each sector confronting a variety of competitive conditions. The business telecommunications market is sometimes referred to as "nonresidential," a designation that may be more accurate since it applies not only to businesses of all sizes, but to government and institutional customers as well. Nonresidential users come in all sizes, from very small "mom and pop" shops to giant multinationals. FCC data indicates that "almost 90 percent of the busi-

55. *United States Telecom Association v. FCC*, 359 F.3d 554 (D.C. Cir. 2004)("*USTA II*").

nesses in the United States have less than 20 employees and likely operate in a single location. Whereas firms with greater than 500 employees, average more than 65 locations per firm."[56]

Table 15

STATISTICS OF U.S. BUSINESSES FOR 2013

	Number of Employees per Firm					
	>5	5–19	20–99	100–499	500 +	Total
Firms	3,575,290	1,592,832	503,033	85,264	18,636	5,775,055
Establishments	3,580,637	1,638,204	684,963	360,590	1,223,959	7,488,353

Source: FCC Business Data Services Order, at para. 73, Table 1.

Thus, one important distinction extant within this "nonresidential" designation is that between the "business" and "enterprise" segments, and within the "business" designation, as between the "small" and "medium-size" business segments. Notably, FCC data also indicate that a facilities-based competitive alternative to incumbent LEC service is available at only a very small fraction of the nearly 7.5-million business "establishments" in the US.[57]

- The "business" market (sometimes referred to as the "Small/Medium Business" ("SMB") market) involves companies or organizations with one or a relatively small number of service locations. "Small businesses" are those with relatively few employees (perhaps less than 20 or 25) and typically require a small number of exchange access voice telephone lines (perhaps less than ten) and usually a broadband Internet access

56. *Business Data Services Order*, at para. 73 and Table 1.

57. *Id.*, at paras. 220, 221.

connection that is comparable in bandwidth and other qualitative attributes to what would be provided to a typical residential customer. Depending upon the nature of the business and number of employees, small businesses may require some type of internal telephone system, such as a hosted (cloud-based) PBX or an on-site small business phone system of some sort. In the past, these systems would have been connected to the outside world via switched exchange access telephone lines or PBX trunks provided by an ILEC. More recently, many small and medium size businesses utilize VoIP-based services known as "Session Initiation Protocol" or "SIP" trunks that can be carried either via the customer's broadband Internet access service (i.e., combined with other Internet traffic) or over a dedicated IP facility to the SIP provider. Services provided to small business are, like residential services, furnished on what is referred to as a "best efforts" basis. That is, the service provider makes no specific commitment as to reliability (uptime) and, in the case of broadband, to the delivered download and upload speeds, but does specify objective levels that will be fulfilled by the provider on a "best efforts" basis.

- "Medium-sized businesses" have between, perhaps, 25 and 500 employees and usually exist at a single headquarters location and perhaps at some relatively small number of satellite locations. For example, a medium-sized business might have one central headquarters location and five to ten retail stores or branch locations in a given metropolitan area. Their requirements would typically include exchange access, an internal telephone system, and possibly some dedicated point-to-point connections between the "headquarters" location and each of the satellite locations. These

interconnections could be furnished as dedicated leased private lines or, more likely, as virtual private network ("VPN") "tunnels" created over ethernet facilities deployed at each location. For "exchange access," such companies are increasingly likely to utilize IP-based services such as SIP trunking connected to an on-premises "softswitch" typically located at the central headquarters location, or via a cloud-based hosted PBX. The nature of the business will materially impact the type of communications facilities that are utilized – if the communications requires a relatively high degree of security (e.g., for financial transactions) or mission-critical reliability, dedicated physical facilities subject to specified Service Level Agreements ("SLAs") may be needed; for others, best-efforts business-grade broadband access services may be more than sufficient. Also depending upon the nature of the application(s) involved, the firm may utilize separate "public Internet" connected broadband access and private, physically isolated Internet Protocol ("IP") services, the latter to support voice services and various internal data communications requirements.

- The "Enterprise" market typically involves companies, governments and institutions with multiple and geographically dispersed locations, large numbers of employees, and high volumes of both internal and external voice and data telecommunications traffic. Company locations are typically interconnected via networks of dedicated transport facilities, either physical or "virtual," or some combination of these. Services are typically purchased under bulk service arrangements known as "Virtual Telecommunications Network Service" ("VTNS") agreements with one or more carriers.

VTNS deals usually run for fixed periods of time (e.g., three years) and require the customer to accept a Minimum Annual Commitment ("MAC") specifying the required annual dollar amount of service that the customer must purchase from the carrier to avoid a penalty. Multinationals may enter into VTNS deals that include both domestic US as well as foreign countries. Although there is often intense competition by multiple carriers for such business, once entered into, a VTNS agreement tends to make the enterprise customer non-addressable by other providers during the term of the contract. In exchange for a large MAC, the customer is often able to negotiate a large discount off the base rates for the various services covered by the agreement. Splitting up the aggregate purchase among multiple providers would typically require each to be competitive with the discounted price available from the other provider(s). Moreover, the VTNS customer has a powerful incentive to consolidate all purchases under one contract so as to obtain the largest available discount, assure that the MAC is achieved, and in so doing avoid shortfall penalties. Very large enterprise customers may sometimes find it practical and possible to negotiate and enter into several concurrent VTNS arrangements with different carriers so as to maintain at least some degree of ongoing competition post-signing. However, such arrangements would typically required smaller MACs with each of the carriers than would be made if there were only one carrier involved, which could in term result in smaller overall discounts being offered to the purchaser.

82. Carriers with geographically extensive service areas and the ability to serve large numbers of customer locations on their own facilities-based infrastructure have a distinct competitive advantage over those with more limited geographic coverage with respect to serving large business and enterprise customers. One of the specific justifications offered by Charter and TWC in support of their recent merger is that the more extensive geographic coverage of a post-merger New Charter will materially expand their ability to compete in the large business/ enterprise segment.[58] Smaller providers can extend the geographic scope of their networks by purchasing wholesale services from ILECs and others, but this solution may not be practical except where a potential customer's off-network requirements are limited.

Experience with partial and, in hindsight, inappropriate and unsuccessful deregulation of the Business Data Services market should provide important guidance for the development of policy with respect to mass market consumer voice and broadband services.

83. The extent to which effective competition is present in the large business/enterprise market has been in dispute for most of the past several decades. Recent findings and initiatives by the FCC may be particularly useful in guiding the development of appropriate regulatory treatment of mass market consumer voice and broadband services going forward. As the following discussion highlights, having first determined that substantial segments of the Business Data Services market were subject to effective competition such that strict price

58. *Joint Application of Çharter Communications, Inc. et al;Time Warner Cable Inc. et al,; Bright House Networks, LLC et al Pursuant to California Public Utilities Code Section 854 f'or Expedited Approval of the Transfer of Control*, Public Version, July 2, 2015, CPUC A.15-07-009, at 23: "The combination of New Charter's greater geographic reach and more rationalized footprint following the Transaction will position New Charter to better compete for enterprise customers, and thus improve competition in that sector."

regulation could be replaced by pricing flexibility and detariffing, the FCC has now come to recognize that certain of the metrics it had used to assess the level of competition were overly simplistic, leading to premature and inappropriate removal of price constraints on significant portions of this market.

84. Initially following the break-up of the former Bell System in 1984, dedicated ILEC-provided last-mile and associated middle-mile services – known as "Special Access" services – were subject to full cost-based pricing and earnings ("rate of return") type regulation at both the state and federal levels. When the FCC in 1990 adopted price cap type regulation for ILECs,[59] price cap regulation was applied to Special Access rates as well. During the 1990s, limited and geographically targeted competition for last-mile special access type services began to develop in the form of dedicated fiber optic "rings" with lateral connections to specific large commercial buildings and building complexes in central business districts in major cities.

85. In response to ILEC contentions that this market had now become "competitive," the FCC in 1999 established a process for introducing "pricing flexibility" in selected markets where certain conditions – referred to as "triggers" – could be demonstrated to have arisen.[60] The FCC

59. *Policy and Rules Concerning Rates for Dominant Carriers*, CC Docket No. 87-313, *Second Report and Order*, 5 FCC Rcd 6786; 1990 FCC LEXIS 5301; 68 Rad. Reg. 2d (P & F) 226, FCC 90-314, Rel. October 4, 1990 ("*ILEC Price Cap Order*"), at para. 13.

60. *Access Charge Reform, CC Docket No. 96-262; Price Cap Performance Review for Local Exchange Carriers*, CC Docket No. 94-1 *et al*., *Fifth Report and Order and Further Notice of Proposed Rulemaking*, 14 FCC Rcd 14221 (1999) ("*Pricing Flexibility Order*").

provided a convenient summary of its 1999 "pricing flexibility" actions in the recent *Business Data Services Order*:

> In 1999, the FCC established a process for granting price cap incumbent LECs a certain degree of pricing flexibility for Business Data Services across Metropolitan Statistical Areas (MSAs) and non-MSA areas when specified regulatory triggers were satisfied. These triggers, which were designed as a proxy for potential competition in the given geographic area, were based on the collocations of non-incumbents in the incumbent LEC's wire centers. To make a competitive showing, the Commission held that price cap LECs would need to demonstrate either that (1) competitors unaffiliated with the incumbent LEC have established operational collocation arrangements in a certain percentage of the incumbent LEC's wire centers in an MSA, or (2) unaffiliated competitors have established operational collocation arrangements in wire centers accounting for a certain percentage of the incumbent LEC's revenues from the services in question in that MSA. In both cases, the incumbent also must show, with respect to each wire center, that at least one collocator is relying on transport facilities provided by a transport provider other than the incumbent LEC.
>
> Under the rules, the Commission granted relief in two phases. Phase I relief, which required lower levels of collocation, gave price cap incumbent LECs the ability to lower their rates through contract tariffs and volume and term discounts, but required that they maintain their generally available price cap-constrained tariff rates to "protect[ ] those customers that lack competitive alternatives." Phase II relief, which required higher levels of collocation, permitted price cap incumbent LECs to raise or lower their rates throughout an area, unconstrained by price cap regulations included in the Commission's part 61 and part 69 rules. The Commission allowed price cap incumbent LECs to obtain Phase I and Phase II pricing flexibility on different Business Data Services segments, i.e., channel termination and dedicated transport services. The thresholds for obtaining regulatory relief for each segment varied. The competitive showings needed for the dedicated transport segment were lower than the showings needed for channel terminations, reflecting the understanding that for higher capacity middle-mile segments of the network, facility-based entry was more likely to occur than with the deployment of last-mile facilities.[61]

61. *Business Data Services Order*, at paras. 17-18, citations omitted.

Generally, the "area" to which Phase I or Phase II treatment would be applied consisted of the entire Metropolitan Statistical Area ("MSA") as defined by the US Department of Commerce. MSAs are large and geographically expansive areas. For example, the San Francisco MSA consists of the entirety of Alameda, Contra Costa, San Francisco, San Mateo, and Marin Counties; the Los Angeles MSA includes all of Los Angeles and Orange Counties. Satisfaction of the FCC "collocation trigger" anywhere within any MSA would subject the entire MSA to pricing flexibility even though the "competition" that the presence of such collocations was supposed to have indicated was likely confined to an extremely small number of specific business districts, leaving the remaining portions of the MSA without any material competitive presence.

86. In 2002, AT&T Corp. (to be distinguished from the current AT&T Inc., the successor to SBC Communications following its merger with AT&T Corp. in 2005) filed a Petition with the FCC in which it claimed, *inter alia*, that ILECs had increased rates for special access by larger amounts than in the "noncompetitive" markets still subject to price cap regulation in precisely those putatively competitive areas in which pricing flexibility had been allowed.[62] That petition spawned a lengthy series of FCC dockets and filings that is still ongoing.

62. *AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates For Interstate Special Access Services*, filed October 15, 2002, RM No. 10593.

87. In 2006, the federal Government Accountability Office ("GAO") issued a report critical of the FCC's "triggers" as the device for assessing the level of competition. As summarized in the *Business Data Services Order*:

> The GAO found that facilities-based competition was not evenly distributed throughout an MSA, but typically existed in a small subset of buildings in an MSA, and that demand concentration drives competitor deployment. The GAO also found that on average, the prices and revenues of price cap incumbent LECs had increased in areas where the Commission had granted Phase II pricing flexibility. On the Commission's ability to monitor competition, the GAO concluded the Commission's pricing flexibility rules did not work to accurately identify effective competition, and the Commission lacked current, specific and reliable data to track and assess the state of competition. The GAO urged the Commission to "revisit the issues it initiated in the rulemaking proceeding on dedicated access and to develop measures and methods to monitor competition on an ongoing basis that more accurately represents market developments and customer choice." To meet its regulatory responsibilities, the GAO recommended the Commission identify "a more accurate measure of effective competition" and "collect more meaningful data.[63]

88. The GAO Report notwithstanding, the Commission in 2006 took several initiatives involving "forbearance from the application of Title II and *Computer Inquiry* requirements" with respect to certain enterprise broadband services provided by Verizon and several other ILECs.[64] Various CLECs, wireless carriers (not affiliated with ILECs) and large user groups persisted in their opposition to the continued nonregulation of these services.

89. Finally, a full decade after the AT&T Corp. Petition had been submitted,

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63. *Business Data Services Order*, at para. 23, citations omitted.

64. See, *Id.*, at para. 24.

> In August 2012, the Commission suspended its rules for the further grant of pricing flexibility to incumbent LECs for the remaining regulated Business Data Services in areas subject to price cap regulation. The Commission took this step based on "significant evidence that these rules ... [were] not working as predicted, and widespread agreement across industry sectors that these rules fail[ed] to accurately reflect competition in today's special access markets." The triggers reflect a simple count of the number of collocations in an incumbent LEC's wire center(s) and "are a poor proxy for the presence of competition . ..." The Commission found collocations did not often result in collocators eventually building their own channel terminations to end users as predicted, and facilities-based competition did not always rely on collocations in wire centers, e.g., with cable systems. These triggers were therefore both over- and under-inclusive as predictors of competition. In addition, the Commission found that "MSAs have generally failed to reflect the scope of competitive entry" and "in many instances, the scope of competitive entry has apparently been far smaller than predicted." The Commission then set course for a one-time data collection "to identify a permanent reliable replacement approach to measure the presence of competition for special access services."[65]

The Wireline Competition Bureau, in December 2012, initiated an extensive data collection effort, requiring carrier submissions of a broad range of market data on Business Data Services. The *Business Data Services Order* presents the results of that effort and proposes a set of regulatory measures designed to better protect customers and competitors with respect to specific services for which effective competition is not yet present.

90. An overarching conclusion of the *Business Data Services Order* is that entrants remain utterly dependent upon wholesale services and access to facilities of incumbent LECs, and that incumbent LECs possess the ability, absent FCC action, to engage in anticompetitive conduct in dealing with competitive carriers with respect to such services. For example:

65. *Id.*, at para. 28, citations omitted.

> Unlike incumbent LECs and cable providers, non-cable operators typically do not ubiquitously deploy connections to locations in a local geographic area but instead target deployment in dense urban areas in response to significant business demand for Business Data Services. Non-cable competitive LECs lack the necessary budgets and economies of scale to viably overbuild and connect all businesses in an area with their own facilities in the hopes of attracting sales. They instead invest in transport within a local area based on potential demand and then rely on a mix of facility-based deployments and leased lines to connect end-user locations to their network facilities.[66]

Elaborating further on this same point, the Commission concluded that:

> While non-incumbent LEC affiliated competitive LECs – including, importantly, cable providers – are making great strides in competing to sell Ethernet services, data from the Commission's business data services mandatory data collection show that these carriers serve no more than 25 percent of buildings with business data services demand over their own networks. Further, the data show that the vast majority of off-net services provided by competitive LECs is provided through either incumbent LEC leased facilities or incumbent LEC UNEs.[67]

Overall, the FCC concluded that the extensive reliance by entrants upon underlying wholesale facilities leased from facilities-based carriers (mostly from ILECs) did not result in an effectively competitive market for Business Data Services:

> While wholesale access can be a cost effective means for a competitive LEC to expand its reach, such a wholesale purchaser cannot place competitive pressure on supply of the underlying facility that it purchases, but rather can only compete by being more efficient at retailing. Thus, we do not consider competition over

66. *Id.*, at para. 54, citations omitted,

67. *Id.*, at para. 90, citations omitted.

> resold lines as a material competitive restraint on any facility-based supplier with market power.[68]

The FCC also concluded that the technology migration from TDM to Ethernet does not materially alter the economic conditions confronting entrants seeking to compete with incumbent LECs:

> *The barriers to entry do not materially differ whether the technology being deployed is TDM- or Ethernet-based.* As Ad Hoc notes, "[t]he underlying transport facilities for Ethernet services are the same as the underlying transport facilities for TDM services," which is consistent with AT&T's observation that "Ethernet is simply a service that can be provided over many different types of transport facilities, including copper, fiber, coaxial, and wireless facilities." BT adds that it is reasonable to conclude that the main Ethernet access cost elements – duct, fiber, and electronics – do not vary much across service speeds up to 1 Gbps." *Legacy TDM services require the same transport facilities and, in most geographic areas, the incumbent already provides TDM service and therefore has an advantage over a new entrant.* That historical incumbent advantage allows the incumbent LEC to lower its costs through its "initial control of all customers" and "us[ing] the same rights of way, trenches, conduit, wires, poles, building access, riser, truck rolls, employees, outside plant, central office equipment, administrative expenses, and other legacy inputs that they use when [they] provision TDM-based special access services."[69]

91. Finally, the FCC has determined that "[its] own analysis [and several expert reports submitted in the proceeding, one of which had been commissioned by the FCC itself] provide direct evidence of market power in the supply of various services."[70] Supporting this finding is

68. *Id.*, at para. 230.

69. *Id.*, at para. 226, emphasis supplied, citations omitted.

70. *Id.*, at para. 237.

the observation that "[k]ey pieces of evidence before us are regression analyses that show price effects due to the presence of competition, which imply that in the absence of competition prices are higher than they otherwise would be ..."[71] Importantly, this finding is based upon evidence of *actual competition*, and not upon the *administrative designation* of a particular market as "competitive" merely because pricing flexibility "triggers" happen to have been nominally satisfied.[72] The FCC also concluded that price caps, where they have remained in effect (in areas that had failed to satisfy pricing flexibility triggers), have consistently been set at the very top of the allowed level, thus demonstrating that "the fact that the price capped incumbent LECs have kept their prices at the top of the cap is additional evidence of market power."[73]

The findings and actions initiated in the FCC *Business Data Services Order* are broadly applicable to all telecommunications industry sectors, including those affecting residential consumers.

92. Although the *Business Data Services Order* focuses specifically upon this segment and, in particular, Business Data Services furnished by facilities-based carriers to other carriers (including CLECs) and wireless (CMRS) providers, the nature of its findings and the scope of the specific remedial measures it both implements and proposes are broadly applicable to all

71. *Id.*

72. *Id. Appendix B*, Rysman, Marc, White Paper: "Empirics of Business Data Services," April 2016. Rysman has developed a regression model examining the relationship between "Average Monthly Price" as the dependent variable and a set of "indicator" or "dummy" competition variables, among others. Examples of Rysman's competition indicator variables, which take on the value of "1" or "0," are "A Facilities-based Competitor Can Serve a Building in the Census Block," "At Least One Facilities-based Competitor is in the Block But Not the Building," and "Two or Three Facilities-based Competitors are in the Block But Not the Building." In all, 13 "competition" variables and 10 other independent variables are included in his regression model. Appendix B, at 246-247.

73. *Business Data Services Order*, at para. 239.

telecommunications services. A major takeaway from the FCC's current findings and conclusions is that overly simplistic indicia of the presence of competition, such as the "collocation triggers" that the FCC had used as the basis for designating an entire MSA as "competitive" and thus subject to pricing flexibility, will not and cannot be expected to yield reliable results. The overly simplistic framework being suggested here by AT&T – and potentially by other incumbent LEC and MSO Respondents – must similarly be rejected. Even in product and/or geographic market segments in which effective competition may be present, the concurrent existence of noncompetitive markets can limit or frustrate the viability of such competition as may exist.

93. I have previously discussed the practice of "bundling" competitive and noncompetitive services into packages targeted at residential customers whose effect is to exclude customers of such "bundles" from being addressed by providers that are unable to compete in all of the sectors included in these "bundled." In the case of Business Data Services, a good example of this same bundling strategy is the persistence of so-called "all-or-nothing" contracts, which "require customers to commit all their relevant in-service purchases, such as DS1 or DS3 channel terminations, to a single pricing plan, which limits the ability of customers to allocate their purchases across different plans" including those offered by competing service providers.[74] "All-or-nothing requirements thus 'lock up' all of a customer's purchases, limiting its ability to minimize the amount of its purchases subject to high percentage and longer term commitments

74. *Id.*, at para. 95.

and restricting its ability to migrate its purchases to alternative providers or to self-provision using its own facilities."[75]

> We find that the all-or-nothing provisions in the AT&T, CenturyLink, Frontier, and Verizon pricing plans, although varying somewhat in nature, all encompass similar harms to customers because they unreasonably restrict purchase options and have not otherwise been justified by reasonable business concerns. These provisions preclude customers from managing their business data services purchases in an economically efficient manner, restricting how they purchase services from the incumbent LEC plans and restricting their ability to consider competitive alternatives. Accordingly, we determine that the all-or-nothing tariff provisions in the Verizon CDPs, NDPs, and TVPs, the Ameritech DCP, the Southwestern Bell DS1 TPP and Pacific Bell DS1 TPP, the CenturyLink RCP, and the Frontier DS1 OPP and TPP, TVPs and NDPs are unjust and unreasonable practices in violation of section 201(b). Accordingly, we direct these carriers to amend their tariffs by removing in each case the relevant language requiring customers to aggregate all their purchases under a single plan and to submit appropriate tariff revisions within sixty (60) days from the release date of this Order to become effective on not less than one day's but not more than fifteen (15) days' notice.[76]

"Bundles" of residential services or services that are targeted to small and medium-size businesses that include, for example, wireline voice, local and long distance calling, broadband Internet access, video, and even wireless can have a similar effect.

94. Finally, the FCC reports that evidence submitted in the Business Data Services data collection indicates that where multiple last-mile providers offer facilities-based Business Data Services connectivity to a given commercial building, the market for service to each such

75. *Id.*

76. *Id.*, at para. 110, citations omitted.

building appears to be subject to effective competition, as reflected in lower prices at such competitive locations.[77]

95. Excluding business and other nonresidential locations where "best efforts" broadband is sufficient for those locations' needs, the FCC has determined that demand for Business Data Services exists at approximately 939,638 locations, and that ILECs have deployed fiber to each of these locations.[78] However, nationwide, only about 265,708 such buildings are being served via fiber by two or more providers capable of furnishing services subject to a Service Level Agreement ("SLA"), and in most of these cases the second provider is the local cable MSO.[79] Only 11,630 buildings – about 1% – have fiber availability from three or more providers.[80] For most of the remaining 6.5-million business locations,[81] ILECs appear to be the dominant facilities-based provider for all business services. There are a number of entities serving the small/medium business market in various ways, at bottom most are ultimately dependent upon noncompetitive incumbent carrier facilities. Business customers that can be satisfied with "best efforts" services can often choose between ILEC and cable MSO for broadband service, which in turn can support a variety of voice and data applications. However, where "best efforts"

77. *Id.*, at para. 238.

78. *Id.*, at para. 220, Table 3.

79. *Id.*

80. *Id.*

81. See Table 15, *supra.*

service will not suffice, competition for the underlying SLA service is largely confined to those 265,708 buildings in which two or more fiber optic providers have a presence.

IR22. What information does the Commission need to collect going forward, in order to timely monitor whether (a) the telecommunications market is operating efficiently, and (b) the rates for telephone services are just and reasonable? How should the Commission collect and use that information, and report on it to the Legislature and ratepayers? Please provide specific data and analysis to support your conclusion.

96. In this testimony, I have provided additional data and analysis establishing that current market conditions are far more consistent with the presence of market power on the part of the incumbent LECs and cable MSOs that dominate the California local voice and broadband markets. In the following discussion, I provide additional details as to the types of information that the Commission should collect, on an ongoing basis,"to timely monitor whether (a) the telecommunications market is operating efficiently, and (b) the rates for telephone services are just and reasonable." I offer these recommendations in the context of the Structure-Conduct-Performance Paradigm that I had outlined in my March 15 testimony.

97. A key conclusion of the FCC's *Business Data Services Order*, and one that is equally applicable across all telecommunications sectors, was that *overly simplistic indicia suggesting the presence of effective competition are an unreliable basis for regulatory policy.* Now, at the end of the two decades or more that the FCC has been attempting to conform its regulatory treatment of special access and business data services to the competitive conditions that *actually* exist in this sector and that directly affect these services' prices and availability, the FCC has now concluded that the pricing flexibility collocation-based "triggers" it had adopted back in

1999 provided "a poor proxy for the presence of competition . ...,"[82] and that under the pricing flexibility regime that was adopted and implemented beginning in 1999, the actual development of facilities-based competition has fallen far short of the Commission's earlier expectations, even after nearly twenty years.[83]

98. The importance of these conclusions extends far beyond interstate special access and business data services. Overly simplistic, "mere existence" tests for the presence of *effective* competition have been applied to a broad range of services both in the interstate and intrastate jurisdictions. Here in California, similar "mere existence" thresholds were adopted in 1989 as part of the New Regulatory Framework ("NRF"),[84] and lay at the core of the essential finding in the 2006 Uniform Regulatory Framework ("URF") order that concluded that ILECs "lack the ability to limit the supply of telecommunications services in voice communications market, and therefore lack the market power needed to sustain prices above the levels that a competitive market would produce" and "that this result holds throughout their service territories and for both business and residential services."[85] For example, Findings of Fact 50 and 51 in the URF Order D.06-08-030 conclude that:

82. *Id.*, at para. 28, citing *Special Access for Price Cap Local Exchange Carriers; AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, WC Docket No. 05-25, RM-10593, *Report and Order*, 27 FCC Rcd 10557, 10560, para. 5 (2012) (*Suspension Order*).

83. *Id.*.

84. *New Regulatory Frameworks*, I.87-11-033, D.89-10-031, 33 CPUC2d 43, 122-128.

85. *Uniform Regulatory Framework*, D.06-08-030, at 117.

50. Review of the extensive record in this proceeding shows that Verizon, AT&T, SureWest, and Frontier lack the ability to limit the supply of telecommunications services in the voice communications market, and therefore lack the market power needed to sustain prices above the levels that a competitive market would produce.

51. This lack of market power pertains throughout the service territories of Verizon, AT&T, SureWest, and Frontier, and holds for both business and residential services based on the ubiquity of the UNE-L unbundling scheme throughout the service territories of each of the four ILECs in this proceeding and on the cross-platform competition present throughout California.

The URF Order specifically *rejected* the use of quantitative measures, such as HHIs, market shares, and relative price levels. It concluded, but without any formal quantitative examination of the cross-elasticities extant as between wireline and wireless voice services, that wireless was a close enough substitute for wireline voice service that price caps or other regulation of non-Lifeline wireline voice prices could be eliminated, without further examining the reasons why a large portion of consumers retained their wireline service together with their wireless service. No formal or quantitative tests of market power, the practicality of non-facilities-based providers' ability to obtain and economically utilize wholesale services offered by dominant facilities-based carriers, the inherent ability of facilities-based providers to manage competition through their effective control of the wholesale services market, the economic viability of firms of various sizes, Minimum Efficient Scale, or any measures of market concentration or market dominance were considered to merit examination.

99. The FCC has now proposed to replace similarly simplistic assumptions regarding competition with more formal, quantitative economic analysis, and the CPUC should pursue a similar course going forward. My March 15 testimony partially addressed IR22 by proposing an

analytical framework by which a more formal analysis could be undertaken. I indicated at that time that, with respect to Information Request 22, "the Commission can apply the framework discussed in this [March 15] testimony to monitor whether the telecommunications market is operating efficiently and if rates for services are just and reasonable," and that, based upon data submitted by Respondents, I would provide "[a]dditional analysis or recommendations on what information the Commission should collect going forward to timely conduct such monitoring ...." and that after reviewing the data submitted by the Respondents I might supplement my response to IR 22. The Commission should consider requiring that Respondents (and potentially other service providers) to submit, on a regular basis going forward, certain additional data and information regarding their operations in California, as follows:

- *Financial reports from carriers*. The Commission had, in the past, required annual submission of detailed Results of Operations reports from the large ILECs. More recently, the scope of these reports has been scaled back, as specified at General Order 104-A. The FCC had been collecting a large body of cost, revenue and other financial data on an ongoing basis through its Automated Reporting Management Information System ("ARMIS"), but discontinued the requirement that such information be provided after 2007. Regular monitoring of ILEC and broadband provider investments, operating expenses, revenue sources and earnings will permit the Commission to evaluate, at a macro level, the extent to which carrier prices are excessive relative to the underlying cost of providing services. Over the past decade, all of these providers have become more diversified in the scope of their business activities. Reports that are strictly

confined to carrier activities (i.e., the provision of voice and data telecommunications services) run the risk of being distorted by misallocation of cost (and potentially of revenues as well) as between Respondents' carrier and other business activities. In specifying the scope and nature of financial reports that will be required going forward, the Commission will need to address this concern.

- *Pricing information and price changes over time.* The Commission should require that Respondents submit detailed pricing data on all of their voice and broadband telecommunications services in a form and at a level of detail that will permit comparability over time, and enable the Commission to monitor pricing trends. The Commission can also monitor price levels and price changes separately for each geographic market (e.g., county or MSA) as a means for assessing whether customers in non-competitive areas are paying more for service than those where competitive choices are available. Pricing data of this sort can also be useful in benchmarking individual carrier performance. Carriers that purport to be offering competing services, or large carriers that claim to be subject to effective competition, would be expected to respond to competing price levels of other carriers. The extent to which this does not occur may provide an important indication as to the actual level of competition that is present in the relevant product or geographic market.

- *Detailed data on the availability and purchases of wholesale services*. The Commission should monitor, on an ongoing basis, both the availability of wholesale services from

facilities-based service providers (including both ILECs and cable MSOs), as well as the extent to which the needs for underlying wholesale services by non-facilities-based competitors and providers of services in adjacent markets are being satisfied. Non-facilities-based providers should be encouraged to advise the Commission as to deficiencies in the availability of wholesale inputs due to overpricing and/or refusals to deal on the part of facilities-based providers.

IR23. If you have identified any market failures, inefficiencies or bottlenecks in your answers to the questions above, please suggest rules, regulations or policies that would ameliorate those market problems.

a. What initiatives can this Commission take to enhance competition within California, and what measures are uniquely within the province and jurisdiction of federal regulatory authorities?

100. The data produced by Respondents and analyzed here is indicative of ongoing market failure in California's telecommunications market. Market concentration and market dominant are exceptionally high, and prices for essential voice and broadband services have been experiencing continual increases since the Commission's adoption of the Uniform Regulatory Framework. In the discussion that follows, I outline potential measures that may be considered and adopted to limit the market power of the dominant incumbent voice and broadband service providers so as to bring California's telecommunications markets closer to the realization of an efficient competitive outcome.

Market structure

101. FOF 57 in the 2006 URF Order concludes that "[p]articularly in a rapidly changing industry like telecommunications, market share tests are inherently backward looking and not a good predictor of future developments." As to their "inherently backward looking" character, this can readily be overcome by monitoring market shares on an ongoing basis, something that can be easily accomplished using the type of Form 477 and similar data that has been requested from Respondents to this OII and which can be routinely collected on an ongoing basis from these same companies. While a one-time "snapshot" of market shares might arguably be seen as backward-looking, the persistence of high market shares on the part of incumbent service providers over an extended period of time is anything but backward-looking. Instead, it provides compelling *ongoing* evidence of a lack of entry except at the fringes of the market, of high Minimum Efficient Scale, and of a dominant firm's ability to extend in market power in a high-MES sector (e.g., last mile residential connectivity) into adjacent and otherwise potentially competitive markets where MES is considerably lower. For example, URF Order FOF 50 finds that "Verizon, AT&T, SureWest, and Frontier lack the ability to limit the supply of telecommunications services in the voice communications market, and therefore lack the market power needed to sustain prices above the levels that a competitive market would produce." However, ten years or so later, the wireline voice market is still dominated by the wireline last-mile providers – i.e., ILECs and cable MSOs – the same companies from which the consumer obtains last-mile connectivity. non-ILEC over-the-top VoIP – the only serious competitive wireline alternative to the wireline provider's voice service, represents only 4.06% of the residential market nationwide.

102. The URF Order generally dismissed the use of HHIs as an indicator of market power for essentially the same reasons as it had dismissed the use of market shares (see FOF 52). Nevertheless, the FCC, the Department of Justice and Federal Trade Commission continue to calculate and rely upon HHIs as indicators of market power. The FCC publishes wireless carrier HHIs for each of 172 individual "Economic Areas" on an annual basis in its Wireless Competition Reports submitted each year to Congress.[86] Table 16 below updates Table 2 in my March 15, 2016 testimony to include one additional year (2014). It provides the FCC's calculation of HHIs for 2011 through 2014 for the six California EAs, and reveals a generally steady and in some cases a persistent *upward* progression of HHIs from one year to the next. Comparing a succession of annual data on market shares and market concentration on an ongoing basis will allow the Commission to overcome the concern expressed in the URF Order that such data is inherently "backward-looking." As the annual figures in Table 16 demonstrate, persistent, and even escalating, HHI values re indicative of an ongoing concern that is likely to persist into the future unless addressed or otherwise recognized as a basis for policy.

86. *17th CMRS Report*, at 17.

Table 16

WIRELESS HHIs FOR CALIFORNIA ECONOMIC AREAS
2011-2014

EA No.	Economic Area	2011	2012	2013	2014
162	Fresno	2953	2989	3787	3556
165	Redding (incl. part of OR)	3299	3405	3621	3748
161	San Diego	2581	2637	2913	2806
163	San Francisco-Oakland-San Jose	2720	2742	2899	2949
164	Sacramento-Yolo	2727	2741	2882	2948
160	Los Angeles-Riverside-Orange County	2415	2437	2634	2627

Source: FCC, 17th Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, rel. Dec. 18, 2014, at 111-115, Table II.C.1. (2011-2013 data), 18th Report, Table II.C.I (2014 data)

It was, in fact, this "highly concentrated" character of the US wireless market that was a key driver of the FCC's several actions rejecting wireless mergers that would have resulted in less than four national wireless carriers. The U.S. Department of Justice calculated and relied heavily upon HHIs in its recent objection to the Staples/Office Depot merger.[87] The HHI is a composite index of market concentration – the higher the HHI, the greater the possibility that incumbent firms will be able to exercise and sustain market power and set prices in excess of a competitive level. Even if a single "snapshot" HHI would constitute a "backward looking" indication of market structure and market power as this Commission had previously concluded, measuring and calculating HHIs on an annual ongoing basis can provide an important indication as to whether policies intended to encourage the development and entry of additional competition are succeeding in achieving that result. Additionally, annual calculation of the Market Dominance Index (MDI) that I have proposed at paras. 60-65 above provides additional

87. FTC *Staples/Office Depot Complaint*, para. 14, at 3-4.

refinement to the basic HHI calculation by separately identifying markets exhibiting high market dominance. All of the subscription and availability data necessary for annual market share, HHI and MDI monitoring should be readily available to the Commission on an ongoing basis, since most of it is already being reported to the FCC by the principal incumbent service providers and certain others.

Market conduct

103. A key indicator of firms' conduct is in their pricing and earnings. URF Order FOF 15 finds that "[e]conomic theory indicates that a reasonably competitive market will, over the long term, yield a system of rates that approximates the costs of providing goods or services because of the inherent political, bureaucratic and procedural factors that influence and slow regulatory decision making." However, because telecommunications rates are no longer subject to any cost-of-service type regulation, for more than two decades the Commission has had no access to the type of data that would permit it to verify that "rates that approximates the costs of providing goods or services" have actually emerged. Importantly, the converse of this finding also applies – if rates are set far in excess of cost, it is reasonable to conclude that a "reasonably competitive market" does not exist.

104. Persistently high levels of earnings is also evidence of sustained market power; indeed, the traditional cost-of-service rate-of-return type regulation was expressly aimed at constraining public utilities' earnings to "competitive" levels – i.e., to levels that recover costs including a "reasonable return" on investment, but that would not result in economic or monopoly profits.

The Commission may, at least at a macro level, be able to continue to monitor earnings levels based upon publicly available information even if it declines to require more detailed filings. Most ILECs and cable MSOs are publicly traded, and so are required to provide detailed financial disclosures in the form of SEC Form 10-K annual reports. However, 10-K data is typically not provided at a level of granularity needed for state-level assessment of earnings levels associated with jurisdictional activities of individual firms. Moreover, reported "profits" at the corporate level may fail to disclose earnings specifically associated with jurisdictional services, particularly since ILECs and cable MSOs are permitted to utilize common plant and organizational resources to jointly furnish jurisdictional and totally nonregulated services. For example, a given firm could be earning excess profits from its "public utility" type services – last-mile exchange and/or broadband access – while diverting some or all of those earnings to support competitive activities in adjacent and unrelated markets. Without sector-specific reporting requirements, such conduct could continue indefinitely and remain entirely under the radar.

105. Ultimately, the Commission may need to reinstate more detailed "results of operations" type financial reporting requirements to the extent that corporate parent company financial disclosures are insufficient for the purpose of detecting persistent excess earnings levels from jurisdictional services. Price trends – particularly at the retail level – may be more readily available both from public sources (e.g., advertisements and company websites) perhaps supplemented by reporting requirements. Price benchmarking, where price trends for specific

services can be compared across several service providers and across multiple state jurisdictions, may help to identify potential pockets of monopoly abuse.

Regulatory and policy options for addressing insufficient competition and service availability in telecom markets

106. The data provided by Respondents to this OII compels a finding that the wireline voice and wireline broadband (25/3) telecommunications markets in California are characterized by extreme market concentration and market dominance by one or at most by two dominant provider(s), and that it is simply unrealistic to expect that competitive marketplace forces will be sufficient to limit the dominant carriers' market power and protect consumers from excessive prices and restricted service availability. This result stands in stark contrast with the Commission's assessment, back in 2006, that incumbent LECs lacked market power and for reason should be afforded the same "uniform" regulatory treatment as smaller rivals. Non-dominant firms had not been subject to significant regulatory requirements or constraints prior to the adoption of the Uniform Regulatory Framework, and for the most part should be afforded that same treatment today. However, the notion that *dominant and often near-monopoly providers* should similarly be relieved of continuing regulatory oversight can no longer be squared with market realities, as revealed and confirmed by their own data as submitted here.

107. There have indeed been significant changes in the telecommunications landscape over the decade since the Commission's adoption of the Uniform Regulatory Framework. The nation's cable television providers have been far more successful than the ILECs in adapting

their wireline distribution infrastructure to support high-speed broadband. As a result, they have become the dominant "last mile" provider, overtaking the ILECs in serving households that want high-speed broadband access in addition to voice telephone service. At the end of the day, however, the result has been simply to replace one dominant provider – the ILEC – with a new dominant provider – the cable company, or at best to retain both as splitting the market for voice/broadband services. Thus, while the players may have changed, the level of market concentration and market dominance has remained largely intact over the period since URF. To be sure, Internet and IP technology have created enormous opportunities for new entrants at the "application" layer (as distinct from the physical, network or transport layers), but much of that activity is utterly dependent upon gaining access to fixed broadband subscribers. In opposing "net neutrality" and in seeking to overturn the FCC's *Open Internet Order*, the incumbent LECs and incumbent cable MSOs have demonstrated their intent to exploit their market power *vis-à-vis* residential broadband to the maximum extent possible. The reality that has been revealed by the data and analysis produced in the Investigation is that dominant and non-dominant firms should *not* be afforded "uniform" regulatory treatment, and that a new and creative approach to constraining the market power of the dominant voice and broadband providers is essential to protect consumers and the continued viability of such competition as can efficiently exist adjacent to the dominant service providers.

108. Having determined that the level of competition for a given service is not sufficient to produce a "competitive outcome" and/or that service deployment targets are unlikely to be met strictly by reliance upon marketplace forces, the Commission can potentially address such

instances of market failure by pursuing any of several S-C-P oriented remedies specifically as to dominant service providers. While not necessarily mutually exclusive, these policy initiatives can be ranked from the least to the most complex.

(1) Impose and enforce specific performance targets addressing service quality, time to repair, customer service, and related issues, and impose monetary penalties for failure to comply.

(2) Impose and enforce specific service availability targets, and impose monetary penalties for failure to comply.

(3) Reintroduce some form of price and earnings regulation.

(4) Adopt specific structural remedies, such as separation of wholesale and retail services along the lines adopted by Ofcom in the UK.

(5) Pursue public broadband infrastructure initiatives.

Performance targets

109. Performance targets relate primarily to service quality in its broadest sense. In competitive markets, firms can be expected to compete both with respect to their products' features/attributes as well as quality. For example, wireless carriers compete with respect to data

speeds, incidence of dropped calls, coverage area, and pricing-related elements such as measured or unlimited usage, month-to-month rollover of unused minutes or bandwidth, and the like. VoIP providers compete with respect to service features, such as voice-to-text e-mailing of voice mail messages, call forwarding options, among others. Although somewhat more difficult to quantify, product and feature innovations are characteristic of competitive markets, as is clearly evident in the market for wireless handsets, smartphones, and tablets. Often in competitive markets, product innovations are *not* accompanied by price increases, whereas when innovations occur in noncompetitive markets the effort is often driven by incremental revenue opportunities. The latter property is evident in the cable MVPD market, where innovations such as multi-room DVRs or increased data rates are usually accompanied by price increases. Only certain of these –- mainly those related to identifiable service quality metrics – are potentially addressable as performance targets for which regulatory measures may be effective. Penalties for substandard performance with respect to service outages, time-to-repair, hold times on calls to customer service, and the like can be developed and penalties applied where the standard is not satisfied. It is important, however, that the standards be realistic and, even more important, that the penalties be greater than the cost of compliance.

Service availability targets

110. In the days of territorial franchises and regulated entry, build-out requirements for coverage of the designated franchise territory could be established and enforced via the imposition of penalties for failure to meet service availability targets. This technique was applied in the earliest days of CMRS licensing, where recipients of the original blocks of 800

MHZ spectrum were required to achieve specified levels of coverage within their respective Cellular Geographic Service Areas (CGSAs). Cable franchises – particularly those issued at a municipal level – were often accompanied by similar build-out targets. Noncompliance penalties can be imposed where build-out targets are not satisfied. However, as with the service quality targets, such penalties must be set in excess of the cost of compliance.

Reintroduction of price or earnings regulation

111. Carriers have long argued that any form of price or earnings regulation discourages investment and thus runs counter to increased coverage in presently unserved or underserved areas. However, the empirical evidence does not support this claim. While price or earnings regulation may be viewed by service providers as a "stick" aimed at limiting their ability to operate in the market, once the potential for reintroduction of price/earnings regulation is seen as a realistic policy option, the potential for *avoiding it* under certain conditions can serve as a "carrot" instead of a stick in helping to constrain monopoly or near-monopoly providers from continuing to increase prices. At the very least, the *possibility* of price and earnings regulation needs to be credibly advanced so as to offer the opportunity for voluntary restraints on excessive prices and price increases in areas of insufficient competition.

112. When originally proposed and adopted, price cap regulation was seen as a middle ground between full rate-of-return regulation and no price regulation at all. Price cap regulation sets ceiling prices that would only apply where there is insufficient competition to produce lower prices. It is a mechanism that is invoked automatically but only when actually needed. Where a

market is not competitive and the incumbent provider would have the ability to set prices at supracompetitive levels, price caps become operative and constrain the monopoly firm's ability to exercise its market power in this manner. Where competition is present, prices should be expected to drop below the historic price levels – i.e., well below the price cap – such that prices will be set by competitive marketplace forces. When originally introduced at the beginning of 1990, NRF-mandated price cap rates were to be modified on an annual basis by a formula that offset the long-term economywide inflation rate (as represented by the year-over-year change in the Gross Domestic Product Price Index ("GDP-PI") by the long-term productivity target (the so-called "X" factor) further adjusted by any exogenous cost change that was considered to be beyond management's control (the "Z" factor). In general, the annual productivity gain tended to exceed the annual inflation rate, resulting in a net drop in PCI-based price levels. However, in the mid-1990s, the Commission replaced the "GDP-PI – X" with a fixed Price Cap Index, in effect locking in the then-existing rate levels as the ceiling rates for all services subject to the cap. In addition, the Commission reclassified a number of services to "competitive" status, thereby removing them from the price cap altogether.

113. In 2004, the FCC set the "X" factor in its price cap formula equal to the overall GDP-PI economywide inflation rate, effective freezing rates for services remaining under price caps at

their 2003 level.[88] The FCC is now considering reinstating a productivity "X" factor in excess of recent GDP-PI levels. As the FCC has explained,

> ... Our current system, in which the X-factor equals its inflation measure, implicitly assumes that changes in business data services productivity perfectly offset inflation in the general economy. *We think such a perfect offset likely did not occur in the business data services industry during the period since the expiration of the CALLS plan* [in 2004]. Given the rapid growth in business data services output, and the everincreasing economies of scale with respect to providing business data services, *per unit costs likely have decreased significantly since that time*. ...
>
> Over the period since the expiration of the CALLS plan, as technology has evolved and for other business reasons, price cap LECs, like other LECs, have been consolidating TDM switches, placing soft-switches, increasing fiber deployments, and decreasing maintenance costs. *We believe that, as a consequence, business data services productivity growth has significantly outpaced inflation and therefore that the price cap LECs are likely charging unreasonably high rates.* In a regulatory environment where prices fail to reflect productivity gains and, consequently, carriers set prices too high, end users will purchase less of the services produced, and the quantity of output will be lower than if prices were set at a competitive level. The productivity of which the plant is capable will not be realized.
>
> We note that some price cap LECs assert that their costs have risen and the fact that the X-factor has been set equal to the GDP-PI has forced them to charge below-cost prices. We are skeptical of this claim: these price cap LECs have not provided any evidence to support their claim that business data services productivity increases have departed from historical patterns and now lag behind productivity increases in the economy as a whole. Additionally, we note that no price cap LEC has filed any request that we examine the frozen productivity factor in light of their claimed increased costs. But even if we were to accept the

88. *Access Charge Reform*, CC Docket Nos. 96-262, 94-1, 99-249, 96-45, *Sixth Report and Order in CC Docket Nos. 96-262 and 94-1, Report and Order in CC Docket No. 99-249, Eleventh Report and Order in CC Docket No. 96-45*, 15 FCC Rcd 12962 (*CALLS Order*), *aff'd in part, rev'd in part, and remanded in part, Texas Office of Public Util. Counsel v. FCC*, 265 F.3d 313 (5th Cir. 2001), *cert. denied, Nat'l Ass'n of State Util. Consumer Advocates v. FCC*, 535 U.S. 986 (2002), *on remand, Access Charge Reform*, CC Docket Nos. 96-262, 94-1, 99-249, 96-45, *Order on Remand*, 18 FCC Rcd 14976 (2003) (*CALLS Remand Order*). at 13025, para. 149; 47 CFR § 61.45(b)(1)(iv).

> price cap LECs' claim, that would only prove that we need to restore the fundamental balance between carriers and ratepayers inherent in the Commission's price cap system.[89]

114. While the FCC is seeking comment with respect to these conclusions, if valid there is no reason to believe or expect that the FCC's assessment is any less applicable to intrastate telecommunications services being provided in California.

115. In its 2015 *Open Internet Order* reclassifying broadband Internet access as a Title II Telecommunications Service, the FCC has initially elected to forebear from applying the full suite of common carrier regulation to this segment. However, that possibility nevertheless exists as a legal matter. The FCC and CPUC should consider developing specific guidelines for the reimposition of common carrier regulatory mechanisms where they have foreborn from doing so at this time. This would confront service providers with a clear understanding of the consequences of conduct that violates such guidelines. It would thus encourage voluntary compliance with broad regulatory principles as a means for avoiding the reimposition of more stringent regulatory measures. Short of full reinstatement of price caps, the Commission might initially consider adoption of a "target price cap index" that can be compared against actual price movements. Target price caps would apply a Target Price Cap Index (TPCI) type of formula of the form:

$$\Delta \text{ TPCI} = \Delta \text{ GDP-PI} - \Delta \text{ X} +/- \text{ Z}$$

89. *Business Data Services Order*, at paras. 365-367, emphasis supplied, citations omitted

where GDP-PI is the applicable inflation rate, X represents the target annual productivity gain, and Z captures exogenous cost changes beyond management's control. Unlike the application of price caps under the NRF, the "Target Price Cap Index" would be used as a benchmark against actual price changes. If the change in actual prices over time departs significantly from the change in the Target Price Cap Index, additional monitoring measures could then be invoked, such as more detailed financial reporting requirements.

Adoption of a wholesale/retail structural approach.

116. Unbundling and interconnection requirements are necessary steps to remove barriers to broadband competition. Several different approaches to addressing this issue have been proposed and/or pursued elsewhere. The Rochester (New York) Telephone Corporation, the predecessor of what is now Frontier Communications, was among the first ILECs to propose a restructuring that would have split the company into a "wholesale" and a separate "retail" entity that would, along with competing CLECs, purchase wholesale access to the company's local access, switching and transport facilities from the wholesale affiliate for repackaging and resale on a retail basis to end-user customers. While the Rochester plan was never implemented, the same basic approach was adopted, and on a far greater scale, in the UK. There, British Telecom was split into two separate (although still affiliated) entities, the wholesale entity known as *Openreach* and the BT retail entity. The establishment of this structural approach achieved – and far more quickly – what Secs. 251/252 of TA96 was attempting to accomplish – the ability for competing *retail* providers to compete for end-user business without having to overbuild the incumbent's network. In the US, the major cable MVPDs did overbuild the ILECs' local

networks, to the point where today the cable provider, and not the ILEC, has far greater market power than the ILECs had in the immediate aftermath of TA96. But unlike the Sec. 251/252 requirements applicable to ILECs, the *Brand X* Supreme Court decision, coupled with the FCC's *Cable Modem Order*, had the effect of insulating the cable MSOs from any unbundling requirement. And even now, with their broadband services having been reclassified as Title II common carrier telecommunications services, the FCC has determined that it will forbear from applying Sec. 251/252 (and other common carrier) obligations on broadband providers. It is not at all clear that the statutory requirements for forbearance with respect to what are now Title II telecommunications services are satisfied by broadband as it is presently constituted. By forbearing from the unbundling and interconnection requirement of the 1996 legislation, the possibility of even retail-level broadband entry is essentially foreclosed. However, the imposition of these requirements both on cable MSOs as well as on ILEC broadband services could help to bring down broadband price levels as well as stimulate investment in currently unserved and underserved areas.

Establishment of a public wholesale broadband network

117. It is instructive to compare the deregulatory approach to broadband deployment that has been adopted in the US to the manner in which other developed countries have sought to achieve universal broadband access. US broadband prices are generally higher, and speeds are generally lower, than in many other countries where a more affirmative level of government involvement has been implemented. In Australia, the national Parliament in 2010 enacted legislation under which Telstra, the dominant fixed-line operator, would transfer its copper and

1 hybrid fiber coaxial infrastructure and wholesale services to a new government-created entity,
2 the National Broadband Network Company ("NBN") that would then be responsible for
3 providing broadband services on a wholesale basis.[90] NBN was to pay Telstra $A 11 billion
4 (roughly equivalent to US $8-billion) for the transferred facilities and existing wholesale
5 business. The NBN's goal is ultimately to connect nearly every home and business in Australia
6 to a network of more than 100 broadband hubs. These hubs are open-access, and *any* retail
7 service provider can use the network to offer broadband services without having to first build or
8 operate its own fiber network.[91] The retail providers are responsible for adding data packaging,
9 encryption, and error correction, and for billing customers directly.[92] This approach captures the
10 efficiencies of a single network while permitting competition at the retail level. The NBN
11 extends services to rural areas and areas with low-population densities that would not be
12 profitable for private sector telephone investment. Similar wholesale/retail strcutrues have been
13 adopted in several other countries, including Sweden, the UK, and New Zealand,[93] although not
14 all have adopted government-owned national wholesale networks. Several other countries
15 adopted regulations requiring the dominant telecommunications provider to offer unbundled
16 broadband access, but not through a structurally separated wholesale entity. With the exception

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90. Tim Kelly and Carlo Maria Rossotto, editors, *Broadband Strategies Handbook*, World Bank (2012), at 124.

91. Choudrie & Middleton (2013). Management of Broadband Technology and Innovation: Policy, Deployment, and Use, at 12.

92. The Rise and Fall of Australia's $44 Billion Broadband Project (2013). http://spectrum.ieee.org/telecom/internet/the-rise-and-fall-of-australias-44-billion-broadband-project/ [accessed on 11 August 2015].

93. *Broadband Strategies Handbook,* fn.96, *supra*, at 49, 121; "U.S. Lags Behind in High-Speed Internet Access,' *The Wall Street Journal*, April 12, 2006,

of DSL, US ILECs and cable MSOs are under no obligation to offer broadband acces either on an unbundled or a wholesale basis and, as discussed above, do not do so.

118. The FCC and the CPUC have articulated broadband deployment targets addressing both penetration and speed, but not price. These targets continue to rely upon the prevailing regulatory paradigm as established in the *Cable Modem* and *Broadband Wireline Internet Access* orders and the Supreme Court's *Brand-X* decision. No specific strategy or program has yet been proposed that would permit these objectives to be achieved under the prevailing regulatory regime. Section 706(a) directs states to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans . . . by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, *or other regulating methods that remove barriers to infrastructure investment*." Emphasis supplied. The "other regulatory measures" that should be considered should include strategies that have been successfully applied in other developed countries. In each of the three change-of-control proceedings that have come before the CPUC in the past two years, ORA has proposed specific conditions for approval that include, among other things, commitments to broadband speed and penetration targets by the post-merger entity. If and to the extent that providers continue to resist acceptance of such conditions, the Commission should examine and potentially adopt "other regulatory measures" as contemplated at TA96 Section 706 whose purpose will be to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all [Californians]."

CONCLUSION

119. The extensive body of data amassed in this OII compels the conclusion that market for residential voice and broadband access in California is highly concentrated, dominated by one or at most two providers with extensive market power, and incapable of producting the "competitive outcome" that the Commission sought to achieve when it adopted the Uniform Regulatory Framework a decade ago. Moreover, a decade of experience under the current URF regime demonstrates that it is simply unrealistic to apply the same "uniform" regulatory treatment to dominant incumbent providers and to nascent and fringe competitors. It is unrealistic to expect additional entrants to amass the capital needed to achieve a ubiquitous overbuild of the existing telecommunications infrastructure. It is equally unrealistic to expect any new entrant to achieve the Minimum Efficient Scale that would make it capable of competing with any of the existing incumbent providers. The recent spate of large telecom mergers and consolidations now makes *de novo* entry even less likely that ever. The Commission shoujld replace the"uniform" regulatory framework with separate regulatory treatement for dominant providers and for nondominant entrants and other onthe competitive fringe. The policy should also recognize the potential for a firm's status (dominant vs. nondominant) to change over time, and respond accordingly.

120. The reality that has been revealed by the data and analysis produced in the Investigation is that dominant and non-dominant firms should not be afforded "uniform" regulatory treatment, and that a new and creative approach to constraining the market power of

the dominant voice and broadband providers is essential to protect consumers and the continued viability of such competition as can efficiently exist. Dominant incumbent LEC and broadband providers, if not constrained by affirmative regulatory measures, can be expected to exploit their market power to steadily increase prices of their core services and engage in practices that will limit competitor opportunities in adjacent and potentially competitive markets. In this testimony I have outlined an escalation of potential regulatory measures that can be implemented in succession to the extent that the earlier initiatives are not sufficient to achieve "an effectively competitive marketplace, one that would create good outcomes for consumers in terms of price, choice, coverage, quality and reliability" in California's telecommunications market.

DECLARATION

I declare under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information and belief, and if called to testify thereon I am prepared to do so.

LEE L. SELWYN

Executed at Boston, Massachusetts
this 1st day of June, 2016.