

**REDACTED – FOR PUBLIC INSPECTION**

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January 27, 2016

By Hand Delivery

Marlene H. Dortch  
Office of the Secretary  
Federal Communications Commission  
455 12th Street, S.W.  
Washington, DC 20054

Re: WC Docket No. 05-25: **Public** Version of the Competitive Analysis of the FCC’s Special Access Data Collection (White Paper) by Mark Israel, Daniel Rubinfeld, and Glen Woroch.

Dear Ms. Dortch:

Pursuant to the Protective Orders adopted by the Commission in WC Docket No. 05-25,<sup>1</sup> we respectfully submit the enclosed **Public** version of the *Competitive Analysis of the FCC’s Special Access Data Collection* (the “White Paper”), which was prepared by Drs. Mark Israel, Daniel Rubinfeld, and Glenn Woroch.

Parties who are admitted to the Protective Orders can request a copy of the Highly Confidential version of the White Paper by contacting Kyle Fiet at Sidley Austin LLP ([kfiet@sidley.com](mailto:kfiet@sidley.com)).

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<sup>1</sup> Special Access for Price Cap Local Exchange Carriers: AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, *Modified Protective Order*, 25 FCC Rcd. 15168 (2010); Special Access for Price Cap Local Exchange Carriers: AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, *Second Protective Order*, 25 FCC Rcd. 17725 (2010); Special Access for Price Cap Local Exchange Carriers: AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, *Order and Data Collection Protective Order*, 29 FCC Rcd. 11657 (2014).



Respectfully,

/s/ Glenn Woroch

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Glenn Woroch

Enclosure

# **Competitive Analysis of the FCC’s Special Access Data Collection**

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**White Paper**

**January 26, 2016**

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## I. INTRODUCTION AND OVERVIEW

### A. Background and Objective

The Federal Communications Commission (hereafter, “the Commission”) is investigating whether evidence of actual and potential competition in the marketplace for special access services justifies the continued enforcement of the rules established in 1999 (which provided regulatory flexibility for those services), or whether the evidence points to a way to modify those rules that could realize greater social benefits and thus promote the public interest.<sup>4</sup>

As part of its investigation, the Commission has collected a substantial volume of data from special access providers and purchasers, including information on facilities and billings, (hereafter, “Special Access Data”), which has been made available to interested parties.<sup>5</sup> The Special Access Data are made available in the “Data Enclave” managed by National Opinion Research Center (“NORC”), an independent research institute at the University of Chicago. We have been retained by seven providers with incumbent telephone operations—Alaska Communications, AT&T, CenturyLink, FairPoint Communications, Frontier Communications, Hawaiian Telcom, and Verizon—to review and analyze the Special Access Data and to evaluate competition for special access services.

Our analysis concentrates on the data submitted by ILECs and Competitive Providers (“competitive providers” or “CP”) in response to the set of requests for “Facilities Information.”<sup>6</sup> We merged into the Special Access Data several additional data sets containing nationwide information on broadband networks and business establishments. We used the merged data to evaluate, at the census block level, the extent to which facilities of competitive providers of special access services are present in each census block accounting for the level of demand for those services.<sup>7</sup>

We address each of the principal questions raised by the Commission in this proceeding: (i) the extent of competition in 2013, the year for which the data are reported; (ii)

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<sup>4</sup> We use the term “special access” to refer to business data services that include conventional TDM and Ethernet dedicated lines as well as best efforts internet access.

<sup>5</sup> The data collection is pursuant to the Commission’s Special Access Data Collection Order On Reconsideration, September 15, 2014, WC Docket No. 05-25, RM-10593.

<sup>6</sup> For Competitive Providers this includes Questions II.A.3 through II.A.11; for ILECs this includes Questions II.B.2 and II.B.3. We use the term “competitive provider” to refer to traditional Competitive Local Exchange Carriers (“CLECs”), cable operators and other competitors combined.

<sup>7</sup> A census block is the smallest tabulation area used by the Census Bureau and the geographic common denominator of the various data series in the Data Enclave.

the regulatory relief adopted in the 1999 Order; and (iii) the advisability of pricing flexibility relief granted in those circumstances.

As we explain below, these data show that competitors have deployed competing facilities in areas where the preponderance of special access demand exists, both in areas where ILECs have already been granted pricing flexibility and in areas where ILECs have obtained limited or no pricing flexibility.

## **B. Overview of the Analysis and Our Findings**

We have conducted the following analysis of the Special Access Data:

- We evaluated the economics of special access services markets and, consistent with the Commission and D.C. Circuit prior findings, and the Horizontal Merger Guidelines, deduced that ILECs face competition for special access services in areas where competitors have made sunk investments in competitive facilities. Accordingly, the central issue in this proceeding, and the central focus of our analysis, is the extent to which competitors have deployed such facilities.
- We used the Special Access Data,<sup>8</sup> supplemented by 2013 data collected for the National Broadband Map, to determine the extent to which competitors have deployed competing facilities in census blocks with special access demand. The result of this data processing generates information on “comprehensive competition.”
- We quantify competition at the census block level because they are small, such that presence anywhere in a census block is a good indication that competition prevails throughout the areas of the census block where there is special access demand. The average size of census blocks in MSAs<sup>9</sup> nationwide that have special access demand is less than 0.15 square miles, and half of these census blocks are less than 0.02 square miles. Consequently, even if only a single competitor has deployed facilities to just one building in a far corner of a census block, that competitor generally would be able to extend those facilities to all or most other buildings that have demand for special access

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<sup>8</sup> The Special Access Data is based on information for 2013 only.

<sup>9</sup> MSAs are defined using the Commission’s cellular market delineations found in the files referenced by the Commission in their instructions to filers submitting data under II.B.7: <http://wireless.fcc.gov/auctions/data/crossreferences/cmacnty1990.xls>, <http://wireless.fcc.gov/auctions/data/crossreferences/cmanames.xls>. Using only those areas designated as “MSA” by the Commission, we assigned these MSA’s to 2010 census blocks (the prevailing delineations in 2013) after adjusting 2010 census blocks to 1990 counties using U.S. Census Bureau data. We note that these delineations are not the same as the U.S. Office of Management and Budget’s metropolitan and micropolitan area delineations in either 1990 or 2010. While the Commission does also distinguish Rural Service Areas (“RSAs”), we exclude them from our analysis.

services in that census block, and thus could compete for business at those other locations as well.

Based on this analysis we reached the following conclusions:

- *Competitors have deployed sunk facilities in virtually every census block accounting for virtually all special access demand.* As of 2013, competitive providers had deployed facilities that compete with ILEC special access services in more than [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the census blocks with special access demand; those census blocks represent about [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the total special access locations with connections and about [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of business establishments in census blocks with special access facilities.
- *The Commission's triggers clearly ensure that Phase II pricing flexibility is permitted only where there is extensive competitive entry throughout an MSA.* Competitive deployment in areas with Phase II pricing flexibility for channel terminations is even more widespread than the MSAs overall. The 2013 Special Access Data confirm that competitive providers of special access services had deployed facilities in about [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the census blocks with special access demand in Phase II MSAs, and that those census blocks in turn represented about [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the total special access locations and approximately [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the total number of business establishments in census blocks with special access facilities.
- *The Commission's current triggers are conservative and under-inclusive in the sense that they have not resulted in Phase II pricing flexibility in many areas where competitors have deployed extensive facilities.* For example, the Special Access Data show that in Phase I areas, competitors have deployed facilities in more than [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of census blocks covering more than [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of special access locations and more than [BEGIN

**HIGHLY CONFIDENTIAL** [REDACTED] **[END HIGHLY CONFIDENTIAL]** percent of business establishments in census blocks with special access facilities.

- *The results are robust even looking at only a more limited set of competitors.* Even if one removes the DOCSIS 3.0 and other broadband connections contained in the National Broadband Map data from the competitive footprints, resulting in “functional competition,” competing providers’ facilities remain pervasive throughout metropolitan areas.
- *All of these metrics understate the extent of competitive deployment as of today, because the 2013 data does not reflect the substantial new entry and expansion by competitors since 2013.* While it provides a limited view, the Special Access Data confirms these trends were underway during the 2013 period.

The remainder of this report is organized as follows. In Section II, we identify the critical economic features of special access services markets, to explain why sunk network investment is an essential and decisive indicator of competition. In Section III, we describe the methods we employed to analyze the extent to which competitors have made sunk investments in special access facilities; we also present the results of our analysis. In Section IV, we conclude.

## **II. THE ECONOMICS OF COMPETITION FOR SPECIAL ACCESS SERVICES AND OF PRICING FLEXIBILITY TRIGGERS**

Our analysis of competition for special access services builds on the key characteristics of the industry. First, the enormous sunk investment needed to supply these services commits providers to compete fiercely with one another in both the short run and the longer term, making the presence of sunk investments a key indicator of competition. Second, the relentless innovation underway in communications technology makes it unlikely that historical patterns of concentration are informative of future competition that is likely to take place among the current service providers.

### **A. Sunk Investment in Network Facilities Provides the Definitive Indication that Competition Prevails in These Markets**

It is well understood that effective market competition is superior to administrative regulation as a means to constrain the exercise of market power and that, in a general sense,



more competition is better than less.<sup>10</sup> However, because competition takes many forms, with the key dimensions of competition varying across industries, measuring the degree of competition in specific industries can be challenging. In the case of a network industry like telecommunications, however, investment in facilities required to deliver service is an especially informative measure of competition. This follows because:

- Outlays for outside plant and transmission equipment represent durable commitments by suppliers to specific geographic locations. Such expenditures are in large part economically “sunk.” This ensures that the provider has an economic incentive to serve the market in the short run and over the longer run.<sup>11</sup>
- Sunk investment thrusts rivals into intense price competition and the likelihood of such price rivalry imposes an effective constraint on the exercise of market power by incumbents.
- Such durable, immobile network investment also ensures that providers will not find it economical to make a quick exit, but rather remain committed to supplying the market for an extended period of time.<sup>12</sup>

It is well understood that sunk investments by entrants under the circumstances we see in the special access marketplace impose a competitive constraint on the pricing of incumbent firms. As noted by Richard Gilbert, “sunk costs are likely to contribute to exit barriers.”<sup>13</sup> Similarly, William Baumol, John Panzar, and Robert Willig note that “sunk costs can . . . become a means to overcome other barriers to entry. The entrant who deliberately incurs substantial sunk costs . . . may thereby make it far more difficult for the incumbent to

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<sup>10</sup> See, for example, Alberto Alesina, Silvia Ardagna, Giuseppe Nicoletti and Fabio Schiantarelli, “Regulation and Investment,” *Journal of the European Economic Association* 3.4 (2005): 791-825; Graeme Guthrie, “Regulating Infrastructure: The Impact on Risk and Investment,” *Journal of Economic Literature* 44.4 (2006): 925-972; Mark Armstrong and David Sappington, “Regulation, Competition, and Liberalization,” *Journal of Economic Literature* (2006): 325-366.

<sup>11</sup> A competitive provider may have the option to sell off network assets to another carrier, thereby reducing the sunkness of its original investment. In any event, those assets remain committed to the local market. For a discussion of the relative merits of facilities-based and service-based competition in local exchange markets, see Glenn Woroch, “Local Network Competition,” Chapter 15, *Handbook of Telecommunications Economics*, Martin Cave, Sumit Majumdar and Ingo Vogelsang, editors, Elsevier Publishing, 2002.

<sup>12</sup> If a competitive provider were to exit the market, its network assets will not be moved to another market, but are likely to be sold to another provider who would then assume the role of the competitor.

<sup>13</sup> Richard Gilbert, “Mobility Barriers and the Value of Incumbency,” in *Handbook of Industrial Organization*, Vol. 1, Richard Schmalensee and Robert Willig, editors, Elsevier Science Publishers, 1989, p. 520.

dislodge him. The entrant, in effect, chooses to burn his bridges so that he is left with far less to lose by remaining in the field.”<sup>14</sup>

Consequently, when multiple carriers make abundant investments in sunk network facilities, competitive outcomes can be assured, and there is no economic basis for singling out ILEC special access services for regulation.

**B. The Potential Supply of Dedicated Service Using Sunk Network Facilities Represents an Essential Component of the Competitive Assessment of These Markets**

We understand that some parties to this proceeding have suggested that historical market shares are useful for assessing the extent of competition in the special access marketplace. That is incorrect. While market shares can be informative in certain competitive settings, they are less informative in dynamically and rapidly evolving marketplaces such as we have here. More importantly, the characteristics of dedicated services markets are such that sunk investment in network facilities provides a more accurate and complete assessment of competition.

Special access transactions exhibit many of the characteristics described in the literature on “bidding markets.”<sup>15</sup> In such markets, several potential suppliers place bids to serve the demands of a prospective customer.<sup>16</sup> Typically, the single supplier that offers the best combination of quality, service, reliability and price that meets the customer’s needs will win the customer’s business. This method of transaction makes economic sense because the configuration of dedicated services needed by the customer can be specific to its situation, and potential suppliers can also offer differentiated services that are unique to their capabilities. Furthermore, special access customers are generally sophisticated purchasers of telecommunications and broadband services that are aware of the alternatives available to them and that have the ability to identify and negotiate the services that best meet their needs.<sup>17</sup>

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<sup>14</sup> William Baumol, John Panzar, and Robert Willig, *Contestable Markets and the Theory of Industry Structure*, (1982), p. 291.

<sup>15</sup> See Paul Klemperer, “Bidding Markets,” report prepared for the UK Competition Commission, June 2005.

<sup>16</sup> Special access pricing flexibility (both Phases I and II) facilitates the provision of special access services using this transaction mechanism by allowing contract pricing.

<sup>17</sup> FCC, *Price Cap Performance Review for Local Exchange Carriers, Fifth Report and Order and Further Notice of Proposed Rulemaking, CC Docket No. 96-262, 14 FCC Rcd. 14221 (rel. Aug. 27, 1999) (Pricing Flexibility Order)*, ¶155 (interexchange carriers are “sophisticated purchasers of telecommunications services, fully capable of finding competitive alternatives where they exist and determining which competitor can best meet their needs.”).

The special access market thus has the characteristics of bidding markets, where potential providers bid for business—often literally purchasers solicit proposals for service. The Commission recognizes that transactions often take place in these markets using a bidding process. Specifically, the Special Access Data Request asks competitive providers to give details of the most recent Requests for Proposals (“RFPs”) for which they submitted a bid.<sup>18</sup> Responses submitted confirm that purchasers of special access services routinely solicit bids from prospective service providers and select from the bids they receive.

Transactions for special access services do not have to be determined by an explicit procurement bidding process, however, in order for those transactions to exhibit the properties of bidding markets. As noted, businesses that buy dedicated services are reasonably sophisticated in their purchase behavior. They are known to solicit offers from several providers, and while a public auction may not occur, the selection of the supplier and determination of the price and terms can result in the same outcomes as a more formal bidding process.

When transactions are effectively driven by a bidding process, or a process that mimics the outcomes of a bidding process, the outcomes may not conform to the standard textbook model in which the market clears at a single posted price. Although a provider may win many special access customers in an area, resulting in a relatively large share of the circuits up for bid, it does not imply that the provider is unconstrained in setting prices for the services. The winning bidder can be effectively constrained by alternative bids submitted by competing suppliers or by the threat of such bids.

Notice that while a legacy incumbent may have larger market share by virtue of historically being among few options, that does not mean that the incumbent is not subject to strong competition once facilities-based entry occurs. The incumbent’s offerings are constrained by the competitive offerings now available in the marketplace. Instead, one would expect to see the incumbents’ share of the market decreasing as competitors’ shares increase, which, as explained below, is precisely what we see in the marketplace for special access services. Once again, in the present context, investment in network facilities is a better measure of current and future competition than are historical market shares.

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<sup>18</sup> Question II.A.11 (Information on Requests for Proposal) requests details on the five most recent RFPs that the competitive provider submitted a bid and won the contract. They may also voluntarily submit details about RFPs they did not win.

As discussed further below, deployment of special access facilities by competitive providers has dramatically expanded in the past several years. Hence, the mere fact that a buyer may have chosen to purchase services from a particular supplier in the past, as reflected in market shares, does not mean that the chosen supplier is not constrained by competition.

Another important characteristic of the special access marketplace – which has repeatedly been recognized by the Commission and the Department of Justice – is that the geographic range of the competition posed by a service provider is not limited to the specific locations of active circuits sold at a particular point in time. This is an additional reason why current shares or even current locations of facilities (without accounting for potential expansion of those locations) do not tell the full story of competition in special access services.

It is relatively easy for a provider to expand its capacity to serve customers within the route structure of its existing network. This may involve increasing the number of circuits or the bandwidth to serve an existing customer or running a connection to a new customer located in a building that it already serves. This may be as simple as lighting an existing fiber strand or activating a circuit that is currently idle, both of which are made easier when core networks are built to a capacity that anticipates the growth in demand. The core network facilities (the primary sunk investment, as described above) are in place and it is just a matter of expanding capacity within the same “competitive footprint.”

It is also the case that the reach of an embedded network can extend beyond the location of its current connections to serve additional customers in the surrounding region. The bulk of the cost in providing service (and the key sunk investment, as described above) lies in the deployment of the core fiber network. In comparison, once a core network is in place, extending laterals requires a significantly smaller capital expenditure per unit of bandwidth, making this a relatively low-cost expansion. As a result, providers with nearby facilities impose an effective competitive constraint on ILEC special access services even if they are not yet actively serving a particular location because they can and do compete for those customers.

A provider’s ability to serve additional customers depends, in part, on the proximity of its network facilities to those customers. How far such laterals can be extended and remain economical will depend on many factors including the nature of the networks of the potential suppliers.

To capture the ability to serve nearby locations, we focus our analysis at the census block level. Generally, census blocks are small geographic areas. The median area of all MSA census blocks for which competitive providers reported a special access location is [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] square miles, while the mean size is [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] square miles.<sup>19</sup> In dense urban areas, a census block can amount to a single office building. This means that even for census blocks with only one competitor, if facilities were located at one corner of a median-sized census block, the competitor would need to extend its facilities by less than 1,100 feet to reach the farthest opposite corner.<sup>20</sup> In most instances, however, there are multiple competitors in census blocks and they tend to be located where the demand for special access exists within the census block, which means that competitors can generally reach all or most demand within the census block. Hence, we focus our measure of competition on census blocks, asking how frequently ILECs face competition from other facilities-based providers in the same census block.

As explained in more detail below, we identified the competitive footprint of each provider within census blocks that are defined by the Census Bureau and represent the smallest area for which it tabulates data.<sup>21</sup> The Commission requested that certain information about providers' facilities be reported in terms of the census blocks in which they are located. For example, Question II.A.5 requests the route maps of the competitive providers' fiber networks. For the protection of confidentiality, the Commission translated those maps into a collection of census blocks that are transected by a route of a fiber network

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<sup>19</sup> The mean size of a census block with special access service is skewed by a small percentage of very large census blocks in remote portions of MSAs. For instance, 75 percent of the metropolitan census blocks with special access service have an area less than [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] square miles which is in the range of about half of the mean size. Consequently, the median size of a census block better reflects that "average" than the mean size for these data.

<sup>20</sup> In 2006, the Department of Justice quantified the geographic scope of competition in special access services in its assessment of the proposed merger. It concluded that a building was not competitively problematic if it was served by a single special access provider and there was demand for two DS3s which could be served by a competitive provider located within 0.1 miles. *See AT&T-BellSouth Merger Order*, WC Docket No. 06-74, Dec. 29, 2006, ¶¶41-42, 46 and footnotes 111-14.

<sup>21</sup> As of 2013, the Census Bureau had defined over 11 million census blocks in the U.S. excluding Puerto Rico and other territories. Nearly 5 million of the census blocks report a population of zero; those could be uninhabited open land or an uninhabited commercial or industrial district.

submitted for this question.<sup>22</sup> We used those locations to identify additional areas that could be served by the rivals using their fiber networks.

We note that access to the original route maps could have provided an even more granular depiction of competitive activity. Nonetheless, for the reasons stated above, the census block data provided by the Commission is sufficient to allow us to ascertain competition at the census block level.

The first step in delineating a service provider's competitive footprint is to identify the locations that it serves (as of 2013) with special access connections. These locations represent areas where the provider offers competition, based on the location of its network facilities.

We next adjoin to these locations the areas transected by competitive providers' fiber networks, including both the competitive providers' fiber rings and cable operators' middle-mile fiber facilities. Data for these facilities, which are part of the network that provides the connections reported in the Special Access Data, were incomplete because they lack last-mile business connections offered by cable companies. To capture that information, we combined the data contained in the Special Access Data collection with data reported in 2013 for the National Broadband Map ("NBM").

When delineating a provider's competitive footprint, we only consider census blocks for which one or more special access locations were reported in the Special Access Data. In other words, we do not extend the footprint of a service provider into areas that according to the Special Access Data are not currently served by some dedicated service provider.

A complete assessment of the scope of competition requires that we match providers' competitive footprints against the location of special access demand, which permits us to quantify the amount of demand potentially served by ILECs that faces competition from competitive providers. The Special Access Data contains measures that could, in theory, be used to adjust for the amount of special access demand by census block, including the number of existing circuits to an area, the bandwidth of those connections, and the revenue they generate. However, the manner in which the data was reported and made available in

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<sup>22</sup> The Commission informed NORC that a fiber route is considered "present" in a census block if it falls within 10 meters of a census block boundary.

the Data Enclave created serious impediments to effectively measuring demand in these ways.<sup>23</sup>

Accordingly, we chose to measure demand for special access services using counts of business establishments in each census block using data from Dun & Bradstreet.<sup>24</sup> In particular, we use the total number of establishments for each census block as our measure of demand and we use this measure of demand to weight each census block in our analysis. Thus, the reported aggregate numbers are not simple counts of census blocks, which would likely provide a misleading picture of competition, but rather account for the extent of potential demand in each census block.

**C. Pricing Flexibility in Areas with Competitive Deployment Is Consistent With Economic Theory**

A key question that the Commission posed in this proceeding is whether the current regime of special access regulation is just and reasonable, and if not, whether changes could be made that will restore those conditions. In particular, are there changes to regulation in those markets deemed not to be sufficiently competitive that would improve consumer welfare? This decision needs consider the fact that the Commission’s pricing flexibility framework has been relatively simple to administer and gives clear guidance to market participants. As the Commission has stated, it is important to base regulation on “objectively measurable criteria . . . so as to avoid delay caused by protracted proceedings and to minimize administrative burdens.”<sup>25</sup>

As a matter of economics, price cap regulation is unnecessary and is, in fact, counterproductive in areas where rivals have deployed competing facilities-based networks. As explained above, where competitors have deployed sunk facilities in an area, they can and do compete against ILEC special access services, and thus provide competition-based market discipline. In allowing pricing flexibility only after rivals have deployed fiber networks, the Commission’s analytical framework recognizes the competitive significance of CLEC deployment in (i) constraining special access prices, as well as (ii) the role of sunk

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<sup>23</sup> The number of circuit elements at a location is reported in responses to Questions II.A.12 and II.B.4, but there is no adjustment for the size of the connections. Connections could be measured in terms of the bandwidth reported for each but, due to security concerns, any circuit that exceeds 1Gbps had its speed masked. Billed revenues could provide another means to measure the amount of demand at a location, but we were unable to reliably match a significant portion of the connections to the billing information found in the Special Access Data. More detail is offered below.

<sup>24</sup> We also sum of the number of locations with connections for each census block as an alternative measure of demand.

<sup>25</sup> *Access Reform NPRM*, 11 FCC Rcd at 21431.

investments in preventing ILEC from charge non-competitive prices as the result of exclusionary or predatory tactics.<sup>26</sup> In this respect, we agree with the prior findings by the Commission that,

“If a competitive LEC has made a substantial sunk investment in equipment, that equipment remains available and capable of providing service in competition with the incumbent, even if the incumbent succeeds in driving that competitor from the market. Another firm can buy the facilities at a price that reflects expected future earnings and, as long as it can charge a price that covers average variable cost, will be able to compete with the incumbent LEC. . . . the presence of facilities-based competition with significant sunk investment makes exclusionary behavior highly unlikely to succeed.”<sup>27</sup>

The fact that ILECs face actual competition where competitors have made sunk investments in facilities is also consistent with the approach employed by the Commission and the Department of Justice in their reviews of telecommunications mergers. For example, the Commission’s order approving the AT&T/BellSouth merger relied on “screens” established by the Department of Justice to determine whether a building could be served by competitive providers’ facilities. This approach appropriately and necessarily recognizes that firms with facilities that can profitably be extended to serve a building are properly considered to be actual competitors to an ILEC.<sup>28</sup>

The Commission’s approach also is consistent with the *DOJ/FTC Horizontal Merger Guidelines*, which recognize the constraining effect on price from firms that could serve a customer within a short period of time.<sup>29</sup> The Merger Guidelines recognize that the ability of firms to profitably enter a market within two years of a merger “likely will deter an anticompetitive merger in its incipiency, or deter or counteract the competitive effects of concern.”<sup>30</sup> We understand that a competitive provider that has already deployed a fiber transport network can typically construct a lateral from that network to serve new or existing customers in less than a year.

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<sup>26</sup> For purposes of this white paper, we use “exclusionary” tactics to mean actions that deter the entry of rivals. By “predatory” tactics, we mean actions that drive rivals out of business.

<sup>27</sup> *Pricing Flexibility Order* ¶ 80. See also *WorldCom, Inc. v. FCC*, 238 F.3d 449, 458-59 (D.C. Cir. 2001) (“the presence of facilities-based competition with significant sunk investment makes exclusionary pricing behavior costly and highly unlikely to succeed,” because “that equipment remains available and capable of providing service in competition with the incumbent, even if the incumbent succeeds in driving that competitor from the market”).

<sup>28</sup> *AT&T-BellSouth Merger Order*, op.cit..

<sup>29</sup> DOJ/FTC Horizontal Merger Guidelines, Section 1.32 available at:

<http://www.justice.gov/atr/public/guidelines/hmg.htm>

<sup>30</sup> *DOJ/FTC Horizontal Merger Guidelines*, Sections 3.0 and 3.2, *Ibid*.



The Commission’s framework also recognizes that it is typically in the public interest to allow ILECs to offer individualized contracts to meet competition from competing providers. The Commission’s approach appropriately recognizes that once rivals have incurred sunk costs in network facilities, restricting an ILEC’s ability to discount its service may harm consumers, and that in such cases there is little basis for concern about exclusionary or predatory tactics. In creating its pricing flexibility triggers, the Commission acknowledged that “once competitors have made irreversible, sunk investments in their networks, continuing to prohibit incumbent LECs from offering services under [a discounted] contract tariff could reduce the efficiency of the market for access services by reducing the incumbent LECs’ ability to meet customers’ needs.”<sup>31</sup>

For these reasons, we agree with the Commission’s proposal in the *Pricing Flexibility Order* “to adopt rules that will allow for the relaxation or even elimination of price cap regulation where we find the presence of actual or potential competition sufficient to ensure that rates, terms and conditions for special access services remain just and reasonable.”<sup>32</sup> Now that the Commission has collected industry-wide data, the Commission’s basic historical approach (using triggers) can be tested. As we explain below, the data confirm that the Commission’s approach was conservative – in the sense of being under-inclusive – in determining where competing providers had made widespread investments in competitive facilities.

Table C-REG shows nearly ubiquitous competitive provider coverage for business establishments, with coverage areas exceeding [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent for MSAs nationwide for all three of the regulatory treatments (Phase II, Phase I, and Price Cap for channel terminations) using our definition of comprehensive competition. When we make these same calculations for the narrower definition of functional competition (*i.e.*, when we exclude DOCSIS 3.0 and other connections shown in the National Broadband Map data) the competitive provider coverage is still nearly ubiquitous: Table F-REG shows that the coverage rates exceed [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent for MSAs nationwide for Phase II and Phase I areas. Even Price Cap areas have coverage rates that exceed [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent.

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<sup>31</sup> *Pricing Flexibility Order*, ¶128.

<sup>32</sup> *Pricing Flexibility Order*, ¶80.

**III. EMPIRICAL ASSESSMENT OF FACILITIES COMPETITION IN SPECIAL ACCESS SERVICES**

The 2013 Special Access Data contain two sources of data that identify competitive investment in facilities. First, Table IIA.4 identifies each location to which a competitive provider has deployed special access connections. Second, the data contains maps showing the locations of fiber facilities used to provide competing special access services. Although the Commission did not make those maps available to interested parties, as described above, the Commission has provided a table that identifies each census block that contains competing fiber facilities deployed by competitive providers, including both CLECs and cable companies. Using these data we were able to determine for each census block where a competitor had deployed either a connection to a location or fiber facilities.

The 2013 Special Access Data, however, does not capture facilities that can be used to provide special access services that compete with ILEC special access offerings such as last-mile broadband service over DOCSIS 3.0 or over optical fiber. To address this issue we supplemented these data with data reported by cable companies in connection with the National Broadband Map. Specifically, in connection with the National Broadband Map, cable companies reported, as of December 2013, the census blocks to which they had deployed Ethernet facilities and DOCSIS 3.0 broadband services, both of which are direct competitors to ILEC special access services.

Using these three sources of data – (1) locations where competitive providers have deployed competing facilities (including cable middle-mile networks); (2) census blocks where competitive providers have deployed competing fiber facilities; and (3) census blocks where competitive providers have deployed Ethernet and DOCSIS 3.0 broadband services – we computed the portion of census blocks where there is special access demand in which competitors had deployed competing facilities as of 2013. We developed these metrics at the national level across MSAs, and for each MSA, for each type of pricing flexibility (Phase II, Phase I, and Price Caps).

As explained below, the results confirm that competitors have deployed competing facilities in preponderance of the census blocks with special access demand – averaging over [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent – and covering more than [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of all special access locations and about [BEGIN HIGHLY

**CONFIDENTIAL]** [REDACTED] **[END HIGHLY CONFIDENTIAL]** percent of all establishments with potential demand for special access services. This is true at the national level across MSAs and at the individual MSA level.<sup>33</sup> It is also true for MSAs that have been granted Phase II and Phase I pricing flexibility (for channel terminations), as well as for the preponderance of MSAs with no Phase I or Phase II relief.<sup>34</sup>

Our analysis also confirms that these results are *not* contingent on including the DOCSIS 3.0 or other connections contained in the National Broadband Map data. Even after removing these connections from the competitive footprints, competitive providers are located in more than **[BEGIN HIGHLY CONFIDENTIAL]** [REDACTED] **[END HIGHLY CONFIDENTIAL]** percent of census blocks, covering more than **[BEGIN HIGHLY CONFIDENTIAL]** [REDACTED] **[END HIGHLY CONFIDENTIAL]** percent of special access locations and over **[BEGIN HIGHLY CONFIDENTIAL]** [REDACTED] **[END HIGHLY CONFIDENTIAL]** percent of business establishments that may have demand for special access services.

In the remainder of this section, we explain our approach to analysing the Special Access Data and we present the results.

#### **A. Methodology Used To Conduct Our Data Analysis**

We concentrated our analysis on the facilities portion of the Special Access Data. We began by assessing the completeness of the various submissions in the critical data fields (e.g., responses to Questions II.A.4 and II.B.3). The results of these explorations were the basis for several adjustments that were recorded in the change log uploaded by NORC to the Data Enclave. While the corrections were being made to the Special Access Data, we proceeded to identify the locations of each connection reported by both ILECs and competitive providers. We excluded from our analysis locations served only by connections the competitive providers reported were supplied using Unbundled Network Elements (“UNEs”) or Unbundled Copper Loops (“UCLs”) as well as those locations in the ILEC

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<sup>33</sup> Our analysis focuses on areas designated by the Commission as MSAs. We exclude non-MSA areas, including regions with Phase I or Phase II pricing flexibility such as Non-MSA Idaho, Non-MSA Delaware, Non-MSA West Virginia, and Non-MSA areas in Alaska. The data show that competitive provider coverage, in Fairbanks, AK and Juneau, AK is comparable to Anchorage, AK.

<sup>34</sup> We relied on Appendix D of the Commission’s *2012 Suspension Order* for the designations of pricing flexibility by MSA for channel terminations. See Appendix D, Pricing Flexibility Grants For Channel Terminations To End Users, *2012 Suspension Order*. The pricing flexibility granted in some MSAs was updated between the *Suspension Order* and the period of these data. We attempted to incorporate these changes in our analysis. Since the triggers for granting flexibility for transport have lower thresholds we are being conservative in our representation of ILECs’ regulatory treatment.

submissions where the bandwidth sold as a UNE connection was indicated as 100% of the total bandwidth sold.<sup>35</sup>

Considerable effort was expended to generate the geo-coordinates of those locations when they were not supplied by the respondents.<sup>36</sup> Once each location was geocoded, we identified the census block in which it was located. With this information, we were able to determine for each census block whether one or more competitive providers owned a special access connection in that census block.

We also identified census blocks in almost all MSAs having a special access connection provided by a competitive provider, but none provided by the ILEC.<sup>37</sup> A likely scenario for this situation would have a competitive provider running a dedicated circuit to a cell tower or to a new business park that is located outside the ILEC’s existing footprint. Nevertheless, we chose to be conservative by assuming that the ILEC has a presence in every census block served by a competitive provider, even when the Special Access Data suggested otherwise.

As a separate task in the data processing step, we supplemented the collection of census blocks served by one or more competitive providers with the responses to Question II.A.5 requesting route maps of competitive fiber networks.<sup>38</sup> This type of competitive presence reflects competitive provider local fiber routes and cable operator middle-mile fiber. In conducting this exercise we included additional records of entry by a competitive provider only for those census blocks that were earlier identified as having a special access connection. That is, if a census block appears in the responses to Question II.A.5, but does not have a location reported in response to Questions II.A.4 or II.B.3, then it is excluded from

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<sup>35</sup> Among the [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] metropolitan census blocks with a competitive provider location as reported in II.A.4, there are [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] census blocks in which some of the competitive provider connections are supplied using UNEs or UCLs. Among the [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] metropolitan census blocks with locations reported by an ILEC in II.B.3, there are [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] census blocks with at least one UNE connection.

<sup>36</sup> On October 30, 2015, the Commission delivered cross walks to NORC containing the coordinates for many locations in II.A.4 and II.B.3. These cross walks were updated periodically since that time. On January 14, 2016, NORC made available a Commission-developed cross walk that matched locations in II.A.4 and II.B.3 to census blocks. Despite the Commission’s efforts, a large number of records remained without coordinates and with insufficient address information to enable geocoding in ArcGIS. We took the Commission’s census block assignments for each location to identify the census block of other locations with the same address (after standardization). We used ArcGIS and Census Bureau data to assign census blocks to the remaining unmatched locations.

<sup>37</sup> A detailed description of MSA delineations is provided in Section I.

<sup>38</sup> These data were first available in the Data Enclave on December 3, 2015.

the analysis. We consider this to be a conservative approach since it avoids speculation about whether special access connections would eventually materialize in those areas.

Finally, to complete our delineation of “comprehensive competition”, we merged in data on selected broadband services that are contained in the National Broadband Map; this information was also recorded by census block. The National Broadband Map is a collaborative effort to identify the location of high-speed broadband services throughout the country.<sup>39</sup> Using the December 2013 version of the National Broadband Map, we selected only those reports which indicated that service was provided using two technology classifications: service provided over a DOCSIS 3.0 link on a coaxial cable or over an optical fiber to the home/pedestal.<sup>40</sup> We then matched the FCC Registration Number (“FRN”) and/or holding company names of carriers reported in the National Broadband Map to parent/holding companies reported in the Data Enclave using a combination of filers’ responses to Questions II.A.1 and II.B.1, and the Commission-provided file “SPADC Filers (122915).xlsx.”

Census blocks are inherently heterogeneous; to obtain a more accurate picture of the extent of competition, we took account of differences in the amount of dedicated service demand across census blocks. As described earlier, potential demand in each census block was determined using the number of business establishments located in each census block as reported by Dun & Bradstreet.<sup>41</sup> This data source provided the most reliable approach for adjusting for differences across census blocks.<sup>42</sup>

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<sup>39</sup> The National Broadband Map was authorized by Congress under the “Broadband Data Improvement Act of 2008.” Its creation was administered by the National Telecommunications and Information Administration, in collaboration with the Commission. The map records the broadband offerings for each census block by service technology and customer type. We included those census blocks that indicated broadband service using DOCSIS 3.0 and/or fiber technology regardless of customer type. We then merged those data with the Special Access Data at the census block-level after de-duplicating the parent company of providers with multiple technologies or fiber reported for a given census block in the facilities data, NBM and Table II.A.5. Using a combination of the lookup table provided by the Commission “SPADC Filers (122915) .xlsx” and the filer responses to Questions II.A.1 and II.B.1, we matched the FRN of broadband providers that appear in the NBM to their provider type, assigning them to be a competitive provider if the FRN and/or holding company name matches to a competitive provider, and to be an ILEC even then when the match is to ILEC connections outside its serving territory. If an FRN or holding company name appeared in the NBM that did not appear in the Special Access Data and was not affiliated with an ILEC, it was considered to be a competitive provider.

<sup>40</sup> The latter category would include locations in which a cable operator delivered broadband service over optical fiber.

<sup>41</sup> Dun & Bradstreet collects and sells commercial data to businesses, and is well known for its proprietary Data Universal Numbering System (D.U.N.S.), which identifies individual business entities with 9-digit numbers. AT&T uses these data in the normal course of business and matched firm locations reported by Dun & Bradstreet to census blocks.

<sup>42</sup> We considered adjusting for the differences across census blocks using three variables provided in the Special Access Data: (i) the number of circuits reported at a location in each census block; (ii) the combined bandwidth

**B. Analysis of the Special Access Data Confirms that Facilities-Based Competition is Pervasive**

In this section, we report on the results of our empirical analyses quantifying the extent of facilities-based competition for dedicated service customers. We first present results that account for all relevant competitive data, hereafter referred to as “comprehensive competition,” which includes: (i) all locations having a ILEC and/or competitive provider connection reported in the Special Access Data after excluding those connections provided using either UNEs or UCLs, (ii) all census blocks transected by a competitive provider’s fiber network reported to that data, and (iii) all census blocks having broadband service provided over cable using the DOCSIS 3.0 standard or over optical fiber as reported to the National Broadband Map.<sup>43</sup>

Table C (attached) presents results for this form of competition for three different metrics. This table identifies the number of census blocks where the data show only ILEC facilities and those where the data show that at least one CLEC has deployed facilities. These data are used to compute the percentage of census blocks with special access demand in which competitive providers have deployed facilities. The table also identifies the number and percentage of special access locations with connections and the portion of business establishments located in census blocks that are served by competitive facilities.

All of these metrics point in the same direction: competitive provider coverage in MSAs exceeds [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY

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of those same connections; and (iii) the amount billed by the provider of those connections. However, due to issues with the data or conceptual reasons, none of these methods was as reliable as Dun & Bradstreet’s number of business establishments.

Specifically, the bandwidth fields in the facilities data were aggregated so that the total bandwidth field of many records was above the Commission’s 1Gbps threshold. We found that [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of competing provider records in Table II.A.4 and nearly [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of ILEC records in Table II.B.3 have masked bandwidth fields. We also attempted to find more reliable bandwidth information from the billing data provided in responses to Questions II.A.12 and II.B.4 where bandwidth is specified at a less aggregated level and is less likely to be above the 1Gbps threshold for masking.

After identifying a bandwidth value for each location in Tables II.A.12 and II.B.4, we attempted to merge the information on the facilities data and still found a large number of locations with masked or missing bandwidth due to a large number of locations in Tables II.A.4 and II.B.3 lacking information in Tables II.A.12 and II.B.4. Only about [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent of the locations in the facilities data have corresponding data in Table II.A.12 and II.B.4.

As with bandwidth, we attempted to find an accurate count of circuits and billing revenue from Tables II.A.12 and II.B.4 for each location in Tables II.A.4 and II.B.3, respectively. Again, due to insufficient matching between these sets of data, both circuit counts and billing revenue were deemed unreliable as census block weights.

<sup>43</sup> Ideally one would supplement the ILEC’s footprint by including areas surrounding locations that it serves, or within a given distance of one of its wire centers. However, due to concerns about confidentiality, the Commission removed coordinate information from ILEC responses to Question II.B.7.

**CONFIDENTIAL]** percent. Nearly **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** percent of business establishments in metropolitan census blocks with special access service reside in census blocks where one or more competitive providers are present.

The results above are national metrics across all MSAs. The results are similar, however, when examining only Phase II areas (for channel terminations), or only Phase I, or Price Cap (i.e., no Phase I or Phase II areas). Results for Phase II, Phase I, and Price Cap areas are shown in Tables C-PF2, C-PF1, and C-PC respectively.

We also conducted a sensitivity analysis as to the extent to which the results are driven by the inclusion of data from the National Broadband Map (including the DOCSIS 3.0 data). For this analysis, we removed the NBM mapping data from the analysis and used only the location and fiber route data contained in the Special Access Data. This analysis confirms that, even ignoring this substantial component of competition in the special access marketplace, competitors have deployed facilities in nearly all of the census blocks where there is special access demand, and that these census blocks contain the preponderance of special access connections and business establishments. For example, these data show that more than **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** percent of business establishments located in census blocks with some type of special access service are in areas where competitors had deployed fiber or connect to a location. The full results of this analysis are reported in Table F (attached).

The tables discussed above presented results assessing competition on a nationwide basis. Next, we take a more detailed look at the competitiveness of specific metropolitan areas. For each major incumbent carrier, we selected three MSAs in their serving territory for each of the three types of price regulation (if possible), and then reported the same statistics as were reported above on a nationwide basis. For each MSA, we found the total number of special access locations, and then selected three of those areas for each of nine incumbents and each of the three types of pricing regulation: the largest area in terms of the number of locations it reported, the smallest area in terms of locations, and the area having the median number of locations. This process resulted in 50 MSAs.<sup>44</sup>

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<sup>44</sup> As multiple ILECs may be present in an MSA, we designated the ILEC with the most special access locations in a given MSA as the “serving ILEC” before calculating the largest, smallest and median MSA by type of regulation for each ILEC.

The coverages of competitive providers for these areas are presented in Table C-MSA. Figures in this table use the measure of comprehensive competition defined above. The table shows that competitive provider coverage consistently exceeds [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent of establishments in the areas, and is nearly [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent in all of the largest metropolitan areas. This pattern holds regardless of the type of pricing regulation applied to the areas. Only a few of the smallest areas show less than [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent competitive coverage and these all exceed [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent. These areas with lower coverage do not currently have Phase II or Phase I pricing flexibility.

**C. Technological Innovation in Dedicated Services Has Ensured Increasing Competitive Constraint of Alternative Facilities**

The analysis set forth above is based on the Special Access Data Collection and for the National Broadband Map. But new competitors have entered since then, and others have continued to expand their networks. As a result, the competition reported in these data from 2013 understates the extent of competition today.

As explained below, publicly available sources confirm that competitive providers and cable companies have continued to expand their networks, and are winning away ILEC customers, especially ILEC TDM-based customers. In addition, as noted above, our analysis excluded locations where CLECs compete using UNEs. In fact, however, CLECs can and do use these connections to provide service in competition with ILECs’ special access services which they purchase at cost-based rates. Accordingly, a more complete economic analysis of competition would account for these facilities as well. The Special Access Data confirms that there are more than [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] additional census blocks nationwide served by competing providers using UNEs or UCLs to offer competing special access services.<sup>45</sup>

The competitive showing was originally designed to capture the existence of effective competition that follows from irreversible, sunk investment in the region. Under the rules,

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<sup>45</sup> There are [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] metropolitan census blocks with competing provider service including connections supplied by UNEs or UCLs compared to [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] metropolitan census blocks with competing provider service excluding connections supplied by UNEs or UCLs.



competition was demonstrated by collocation by CLECs at the ILEC wire centers in the region. It was believed that such committed entry could impose a competitive constraint that would “discourage incumbent LECs from successfully pursuing exclusionary strategies.”<sup>46</sup>

In this respect, it is also important to recognize that the rapid growth of IP-based dedicated services, combined with the gradual decline in traditional circuit-based dedicated services, that IP-based services are a close substitute for TDM services.<sup>47</sup> The cost of equipment based on IP standards continues to fall. That equipment also enables customers to take advantage of converged solutions in which packetized voice, data, facsimile and video all ride on the same equipment.<sup>48</sup>

Today, cable operators are suppliers of a substantial portion of competitive special access services and they do so without the need of collocating at ILEC wire centers. In fact, three cable operators are among the eight largest Ethernet providers in the country based on retail share of Ethernet ports.<sup>49</sup>

The Special Access Data offers a limited view of these time trends. Comparing the record at the beginning and end of the sample period of the Special Access Data confirms the robust growth in competitive providers’ business. We compared several metrics of special access services between January 2013 and December 2013 for ILECs and competitive providers, including monthly billings, and counts of circuit elements and customers. For each metric, the competitive providers’ growth rate exceeded that for the ILECs. In particular, the counts of circuit elements increased by [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent and customers increased by [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent for competitive providers over this one-year period while those same metrics *shrank* for the ILECs by [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent

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<sup>46</sup> *Pricing Flexibility Order* at ¶69.

<sup>47</sup> Rick Malone, Vertical Systems Group, stated: “U.S. Ethernet port growth was unprecedented in the first half of 2015 and easily surpassed previous estimates. This market seems to be defying the law of large numbers, as there are few indications of the typical slowing growth patterns that we look for when services reach this size and maturity. Primary drivers for growth are massive migration from TDM to Ethernet services, robust demand for higher speed Ethernet private lines and rising requirements for connectivity to public and private Clouds.” See Vertical Systems Group, Inc., “Mid-Year 2015 U.S. Carrier Ethernet LEADERBOARD,” August 24, 2015, available at: <http://www.verticalsystems.com/vsglb/mid-year-2015-u-s-carrier-ethernet-leaderboard/>.

<sup>48</sup> Carriers also benefit from the lower cost of the same improvements in IP-based equipment. The equipment is more efficient because it can not only transport different types of content but can effectively share scarce bandwidth across multiple users.

<sup>49</sup> See Vertical Systems Group, Inc., “Mid-Year 2015 U.S. Carrier Ethernet LEADERBOARD,” op.cit. Five cable operators appear on Vertical Systems Group’s list of the top fourteen Ethernet carriers.

and [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent, respectively. Additionally, total in-cycle monthly billings increased by [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent for competitive providers compared to an increase [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent for ILECs in this period. From all indications, these trends have continued since the end of 2013.

Similarly, mobile wireless customers are moving in this same direction as their networks witness skyrocketing growth in data and video with increasing adoption of 4G-enabled smartphones. The wireless use of data and video is making significant demands on mobile backhaul networks, and traditional TDM links are not economic as evidenced by the fact that mobile carriers have shifted virtually all of their backhaul to Ethernet.

In fact, the migration from TDM services to IP-based technologies was part of the reason the Commission has undertaken its technology transition initiative.<sup>50</sup> The Commission recognized that the industry is well along in its way toward an all-IP network and it must pave the way to transition away from legacy networks and services. Rule-making to facilitate the technology transition is well underway.<sup>51</sup> Special access services are not immune from the technological revolution that is occurring in communications.

The TDM-to-Ethernet migration is evident from the Special Access Data even if only based on a partial view. Again comparing January 2013 and December 2013, we calculated that the bandwidth of Ethernet circuits provisioned by ILECs and competitive providers grew at [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent and [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] percent, respectively. Strikingly, competitive providers' bandwidth grew at six times the growth rate of the ILECs. In addition, because the Commission decided to mask the bandwidth of any circuit that exceeded 1Gbps, these figures likely under-estimate the bandwidth growth rate of competitive providers. The reason is that competitive providers supply relatively more circuits that exceed this threshold, and by capping them at 1Gbps, the

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<sup>50</sup> FCC Press Release, *FCC Chairman Julius Genachowski Announces Formation of "Technology Transitions Policy Task Force,"* Released: Dec. 10, 2012, available at <http://www.fcc.gov/document/fcc-chairman-announces-technology-transitions-policy-task-force>.

<sup>51</sup> FCC, *Technology Transitions, Order, Report and Order and Further Notice of Proposed Rulemaking, Report and Order, Order and Further Notice of Proposed Rulemaking, Proposal for Ongoing Data Initiative*, FCC 14-5, Released: Jan. 31, 2014.

estimated growth rate of packet-based bandwidth is artificially low for competitive providers.<sup>52</sup>

#### IV. CONCLUSIONS

In summary, we find evidence of abundant competition for special access services. As of 2013, our assessment of “comprehensive competition” confirms that competitors have deployed sunk facilities in virtually every census block accounting for virtually all special access demand as measured by business establishments. Using this notion of competition, we find that there is widespread entry of competitive facilities in MSAs with Phase II pricing flexibility, and consistent with the objectives of the Commission’s triggers. In areas with Phase I pricing flexibility, and even those under Price Caps, the evidence points to the Commission’s current triggers being under-inclusive given the extensive competitive facilities that have been deployed in those MSAs. Our competitive assessments are unchanged when we adopt the narrower definition of “functional competition” which removes from the competitive footprints those networks that provide broadband access over cable using DOCSIS 3.0 and optical fiber. Furthermore, because the Special Access Data represent 2013 only, this analysis does not account for the ongoing entry by competitive providers and expansion of established competitors, and the steady migration from TDM to Ethernet connections.

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<sup>52</sup> The number of competitive providers’ circuits that have bandwidth exceeding 1Gbps increased from [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] between January and December of 2013, an increase of [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent. Over this same period, the number of masked ILEC circuits *decreased* from [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] a fall of about [BEGIN HIGHLY CONFIDENTIAL] [REDACTED] [END HIGHLY CONFIDENTIAL] percent. Consequently, the masking likely biases downward the bandwidth growth rate for competitive providers since we assumed those connections had 1,001 Mbps of bandwidth.









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