**REDACTED – FOR PUBLIC INSPECTION**

July 14, 2016

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

**Re: *Business Data Services in an Internet Protocol Environment*, WC Docket No. 16-143, *Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans*, WC Docket No. 15-247, *Special Access for Price Cap Local Exchange Carriers*, WC Docket No. 05-25, *AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, RM-10593**

Dear Ms. Dortch:

Pursuant to the Protective Orders in effect in the above-referenced proceedings,[1] the Commission's April, 6, 2016 Public Notice[2] addressing the treatment of data that is derived from Highly Confidential and Confidential data in the data collection, and outside counsel to Windstream's consultation with Commission staff, I hereby submit this Public version of my June 28, 2016 Declaration on Competition and Market Power in the Provision of Business Data Services on behalf of Level 3 and Windstream. This

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[1] *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); *Investigation of Certain Price Cap Local Exchange Carrier Business Services Tariff Pricing Plans; 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 Protective Orders, 30 FCC Rcd. 13680 (2015); *Business Data Services in an Internet Protocol Environment; Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans; 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, WC Docket Nos. 16-143, 15-247, & 05-25, and RM-10593, DA 16-722 (rel. June 24, 2016).

[2] *Public Statements Derived from Highly Confidential Data Filed in Response to the Business Data Services (Special Access) Data Collection*, Public Notice, 31 FCC Rcd. 3420 (Wir. Comp. Bur. 2016).

version of the Declaration has been revised to strike the designation of certain material as Highly Confidential.

Parties who are admitted to the Protective Orders can request a copy of the Highly Confidential version of this Declaration by contacting Mia Guizzetti Hayes at Willkie Farr & Gallagher LLP (mhayes@willkie.com).

Please do not hesitate to contact me at 202-274-4315 if you have any questions regarding this submission.

Sincerely,

Jonathan Baker

**REDACTED – FOR PUBLIC INSPECTION**

**Before the**
**Federal Communications Commission**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| | ) | |
| Business Data Services in an Internet Protocol Environment | ) | WC Docket No. 16-143 |
| | ) | |
| Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans | ) | WC Docket No. 15-247 |
| | ) | |
| Special Access Rates for Price Cap Local Exchange Carriers | ) | WC Docket No. 05-25 |
| | ) | |
| AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services | ) | RM-10593 |

**DECLARATION OF JONATHAN B. BAKER ON COMPETITION AND MARKET POWER IN THE PROVISION OF BUSINESS DATA SERVICES**

## I. Introduction

1. I have been asked by Level 3 Communications and Windstream to comment on the competition analysis presented in the Federal Communication Commission's (FCC's) Further Notice of Proposed Rulemaking (FNPRM) in this matter and in the white paper submitted by Dr. Marc Rysman, the FCC's outside econometrician, which was appended to the FNPRM.[1] This declaration supplements the declarations I have

[1] Business Data Services in an Internet Protocol Environment; Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans; Special Access Rates for Price Cap Local

previously submitted in this proceeding.[2] Throughout this declaration, I will follow the FCC's practice in the FNPRM of referring to "business data services" rather than using the terms "dedicated services" (which I used in my previous declarations) or "special access."

2. Section II of this declaration explains that Dr. Rysman and I, using different empirical approaches, both find empirical evidence supporting the conclusion that incumbent local exchange carrier (ILEC) prices for business data services exceed competitive levels, reflecting the exercise of market power. We both find that prices tend to decline as rivalry increases: as the number of last-mile facilities-based business data services providers serving a location (building) rises, ILEC prices tend to fall.[3]

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Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, Tariff Investigation Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 4723 (April 28, 2016) (FNPRM); Dr. Mark Rysman, Empirics of Business Data Services (April 2016) (attached as Appendix B to FNPRM) (Rysman Rep.).

[2] Declaration of Jonathan B. Baker on Market Power in the Provision of Dedicated (Special Access) Services (Jan. 22, 2016) (attached to Letter from Jonathan B. Baker to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25, RM-10593 (Jan. 27, 2016)) (Baker Decl.); Reply Declaration of Jonathan B. Baker on Market Power in the Provision of Dedicated (Special Access) Services (Feb. 17, 2016) (attached to Letter from Jonathan B. Baker to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25, RM-10593 (Feb. 19, 2016)) (Baker Reply Decl.); Supplemental Reply Declaration of Jonathan B. Baker on Market Power in the Provision of Dedicated (Special Access) Services (March 1, 2016) (attached to Letter from Jonathan B. Baker to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25, RM-10593 (March 2, 2016)) (Baker Supp. Reply Decl.); Second Supplemental Reply Declaration of Jonathan B. Baker on Market Power in the Provision of Dedicated (Special Access) Services (April 21, 2016) (attached to Letter from Jonathan B. Baker to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25, RM-10593 (April 21, 2016)) (Baker 2d Supp. Reply Decl.).

[3] Throughout this declaration, when I refer to "business data services providers", unless otherwise expressly stated, I am including only firms that provide business data services over their own last-mile facilities, including an IRU, and am excluding firms that provide such services over an unbundled network element (UNE) or leased facilities (other than through an IRU agreement). Similarly, references to "rivals" or "rivalry" are to last-mile facilities-based rivals, and "connections" to last-mile facilities-based connections.

3. Section III.A presents empirical evidence that ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ the incumbent local exchange carriers (ILECs) exercise market power at high bandwidths (above 45 or 50 Mbps). Prices of high-bandwidth connections are likely substantially in excess of competitive levels. (For example, the presence of four or more in-building and four or more in-block high-bandwidth rivals lowers the prices of high-bandwidth connections by 43% according to one estimate and by 25% according to another.) This evidence does not support the suggestion that all business data services markets at bandwidths above 50 Mbps are competitive. These conclusions are buttressed by ~~**[END HIGHLY CONFIDENTIAL]**~~ an analysis in Section III.C of the likely direction of biases in estimating a relationship between price and the number of rivals in the FCC's business data services data. In addition, Section III.D explains why the validity of my empirical analyses of the business data services data is not called into question by the data on the location of hybrid fiber-coaxial networks capable of providing Ethernet connections during 2013 that was recently submitted by several cable providers.

4. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The empirical evidence presented in Section III.A further shows that the full effect of rivalry on price likely requires the presence of (at least) four in-building providers and four nearby providers. Moreover, as Section III.B explains, neither the empirical evidence ~~**[END HIGHLY CONFIDENTIAL]**~~ nor the entry

analysis discussed in this section ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ reliably identifies a critical bandwidth level between 45 Mbps and 1 Gbps beyond which ease of entry reduces competitive concerns so much as to make regulation unnecessary. ~~**[END HIGHLY CONFIDENTIAL]**~~

## II. Market Power in the Provision of Business Data Services

5. As explained in my previous declarations in this proceeding, ILECs are likely able to exercise market power in the provision of business data services in most markets, and would be expected to charge prices above competitive levels unless prevented by regulation. That conclusion is based on the structure of business data services markets, and is consistent with my analysis of the business data services data provided through the FCC's 2015 Data Collection.[4]

6. My prior analysis supports several findings in the FNPRM about competition in the supply of business data services. Among other things, I explained why best efforts services are not competitive substitutes for business data services, and showed that concentration is high.[5] The FCC's

[4] The 2015 Data Collection covered business data services provided during 2013. *See* FNPRM ¶¶ 36-37.

[5] *Compare* FNPRM ¶ 160 ("Best Efforts services do not appear to be competitive substitutes for BDS."), *and id.* ¶ 161 ("Geographic concentration on any measure is high."), *with* Baker Decl. ¶¶ 31-33 (explaining why best efforts business broadband should be excluded from a business data services product market), *and id.* ¶¶ 44-46 (explaining most customer locations are served by a single firm, and most of the rest are served by only two firms). The FNPRM finds that market concentration is high within geographic markets that were defined based on both demand substitution and supply substitution considerations. *See* FNPRM ¶ 216. The market shares I presented were based on the approach to market definition employed by the Merger Guidelines, which looks solely to demand substitution. U.S. Dep't of Justice & Fed. Trade Comm'n, Horizontal Merger Guidelines § 4.1.1 (2010).

conclusion that nearby suppliers can constrain the price of business data services is also consistent with the empirical results I presented previously, with the caveat that the same empirical evidence also indicates that in-building providers provide a greater price constraint, on average, than nearby providers.[6]

7. Dr. Rysman's analysis of the FCC's business data services data is broadly consistent with mine. He finds that prices fall when a provider of business data services faces competition, and indicates that this empirical result provides evidence that these providers exercise market power when they do not face rivalry.[7] As Dr. Rysman explains, "if more competition reduces prices, it tells us that markets without competition exhibit market power."[8]

8. In the prior work referenced above, Dr. Rysman and I both find that ILEC prices tend to fall as the number of in-building rivals increases,[9] though we employ different regression specifications, analyze different measures of price, and cut the data in different ways.[10] Dr. Rysman

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[6] *Compare* FNPRM ¶ 161 (finding "nearby suppliers can constrain BDS prices"), *with* Baker Decl. ¶ 63 (identifying a "greater cumulative effect of in-building providers" relative to nearby providers).

[7] Rysman Rep. at 211.

[8] Rysman Rep. at 227; *accord* Baker Decl. ¶ 54.

[9] In the same analyses, Dr. Rysman and I each also found that prices tend to fall further as the number of nearby rivals increases.

[10] Our approaches also differ in the control variables employed, the way we constructed some variables, and the way we cleaned the data.

aggregates ILEC prices (studying retail and wholesale prices together) and separates out three bandwidth categories. He finds an inverse relationship between rivalry and price for DS1 and DS3 prices.[11] The primary specification in my prior work instead separates out ILEC retail prices and combines bandwidths.[12] That analysis also finds an inverse relationship between rivalry and price.[13]

9. The overarching conclusion that Dr. Rysman and I both reach – that greater rivalry tends to lower the price of business data services – is robust to the differences in the empirical approaches we adopted. That robustness supports the FCC's description of the empirical results as providing "direct evidence of market power in the supply of various services."[14]

## III. Market Power at High Bandwidths

### A. Estimation Results

10. The FNPRM suggests that the supply of business data services with a bandwidth in excess of 50 Mbps "tends to be more competitive" than the

[11] *E.g.*, Rysman Rep. at 229-30 (reporting estimates of the reduction in DS1 and DS3 prices associated with the presence of facilities-based in building rivals).

[12] My first declaration also reports results for specifications that combine wholesale and retail prices and specifications that separate out bandwidth tiers.

[13] *E.g.*, Baker Decl. ¶ 63 (reporting estimate of the cumulative effect of four or more in-building providers on ILEC retail prices over all bandwidths).

[14] FNPRM ¶ 237.

supply of business data services with lower bandwidths[15] based in part on Dr. Rysman's empirical results evaluating the influence of rivalry on the prices of business data services connections at bandwidths above 45 Mbps.[16] Yet, when Dr. Rysman's approach is modified as explained below, the data reveal ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ an inverse relationship between rivalry and price for high-bandwidth connections, and thus suggest the exercise of ILEC market power in the supply of high-bandwidth business data services connections. Accordingly, the empirical analysis of the FCC's business data services data does not support a presumption that the ILECs lack market power in the provision of high-bandwidth business data services connections or that the ILECs do not exercise market power with respect to those connections (or connections with bandwidths below 45 or 50 Mbps). Instead the empirical analysis provides evidence that the ILECs exercise market power, and charge supracompetitive prices, at both lower bandwidths (below 45 or 50 Mbps) and higher bandwidths.

11. The eight columns in Table 1 report the results of relating the price of high-bandwidth connections, as defined by Dr. Rysman to include both retail and wholesale ILEC connections, to various measures of rivalry. ~~**[END HIGHLY CONFIDENTIAL]**~~ These specifications are modeled

[15] FNPRM ¶ 162.

[16] FNPRM ¶ 244.

on Dr. Rysman's Table 19 specification (though Dr. Rysman did not estimate that specification for connections in the high-bandwidth category),[17] and modify Dr. Rysman's approach in four ways.[18]

12. First, the results summarized in columns 1 through 4 account for the presence of (at least one) in-building rival and (at least one) nearby rival, with the columns varying according to the location fixed effects employed and the observations included in the sample, as discussed further below.[19] By contrast, the results summarized in columns 5 through 8 account for the total number of in-building and nearby rivals (not just presence or absence), with the columns again varying according to the fixed effect specifications and observations included.[20] (Dr. Rysman's Table 19 specification is instead a hybrid of the two approaches I adopted: it accounts for the *presence* of in-building rivals (as I do in columns 1 through 4) and the *number* of nearby rivals (as I do in columns 5 through 8).) The columns of Table 1 follow Dr. Rysman by reporting results

[17] The specifications include the control variables Dr. Rysman employed in the DS1 and DS3 specifications he reported in his Table 19, as well as a variable accounting for whether the connection was packet-based comparable to what Dr. Rysman included in the high bandwidth specifications reported in his Tables 14-18. *See* Rysman Rep. at 234-41. As discussed below, bandwidth variations are accounted for differently. Before varying Dr. Rysman's approach, his results were first replicated. It was not possible to do so perfectly because the FCC masked some variables.

[18] The empirical analyses reported here adopt Dr. Rysman's approach to cleaning the data and constructing the regression data set.

[19] This specification is analogous to those reported in Table 3 of my initial declaration. Baker Decl. tbl. 3.

[20] This specification is analogous to those reported in Table 2 of my initial declaration. Baker Decl. tbl. 2.

alternately using Census tract fixed effects (odd-numbered columns) and county fixed effects (even-numbered columns).[21]

13. Second, Dr. Rysman's approach to accounting for the number of nearby rivals is modified in the results reported in columns 5 to 8 to allow for the possibility that each incremental nearby provider influences price differently. It does so by including separate variables to account for the competitive influence of the second and third nearby provider, while Dr. Rysman used one variable to account for their combined influence.

14. The third modification involves the identification of nearby providers. In his Table 19, Dr. Rysman does so based on whether the rivals have a facilities-based connection in the relevant Census block. In the results presented here, nearby providers are instead identified (albeit overinclusively due to limitations in the underlying data) as those with the potential to provide high-bandwidth connections, which will be referred to interchangeably as "nearby rivals" or as "in-block high-bandwidth rivals."[22] It is appropriate to focus on fiber-based providers, as

[21] *See* Rysman Rep. at 229 (indicating that it is "difficult to say" whether Census tract fixed effects or county fixed effects are "more appropriate").

[22] In my prior empirical analyses, I identified a provider as being nearby if it had fiber within either the same Census block or a Census block with a boundary less than 0.5 miles away. Baker Decl. ¶ 43. Here I follow Dr. Rysman's approach of limiting nearby providers to those with facilities within the same Census block, but not serving a given building. In order to focus on firms potentially offering high-bandwidth connections, I further limit nearby providers to those with fiber-based facilities. More specifically, the variable I use identifies a firm as an in-block high-bandwidth rival if it appears in the business data services data with a fiber connection to at least one building in the Census block or with a fiber network present in the Census block (and is not an in-building provider, currently offering service in the building where the customer is located). This approach to identifying in-block high-bandwidth rivals is likely overinclusive because it does not address the plausible possibility that different kinds of nearby providers (*e.g.*, those currently providing high-bandwidth connections with fiber-based facilities, those providing

distinguished from providers not using fiber-based facilities, when identifying nearby firms with the potential to provide high-bandwidth service because fiber connections are typically employed when high transmission capacity is required.[23]

15. Fourth, Dr. Rysman's approach is modified by introducing fixed effects to control for specific ILEC providers and specified bandwidth levels. The fixed effects identify the provider and bandwidth speed ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ for the major providers (AT&T, Century Link, and Verizon) at the primary bandwidth speeds in the data for the high-bandwidth category (50 Mbps, 100 Mbps, 155.52 Mbps, 200 Mbps, 622.08 Mbps, and 1 Gbps or greater).[24] ~~**[END HIGHLY CONFIDENTIAL]**~~ The specifications are estimated on two samples: the high-bandwidth sample used by Dr. Rysman, ~~**[BEGIN HIGHLY**~~

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lower bandwidth connections with fiber-based facilities, those not providing any connections but with a fiber splice point in the Census block, and those not providing any connections and not offering a splice point but with fiber-based facilities passing through the Census block) would pose different degrees of competitive constraint. It is not possible in the data to identify separately, among firms with fiber in the Census block but no connections, firms that offer splice points in the Census block and those purely passing through the Census block with no splice point. For these reasons, the definition of nearby providers used here for the purpose of estimating their influence on price in the business data services data is likely too broad to serve as the basis for a definition that would be used to determine the number of nearby providers when determining whether regulation is appropriate.

[23] Baker Decl. ¶ 12. Non-fiber connections typically have lower maximum bandwidths than fiber connections and may have less reliable service. *Id.* Although the competitive constraint on ILEC prices provided by the non-fiber connections of providers in the Census block may be greater at lower bandwidths, these results do not demonstrate the absence of a competitive constraint from such connections at bandwidths above 45 Mbps. Moreover, the results presented in my previous declaration and in Dr. Rysman's report demonstrate that all connections by nearby providers matter competitively in the data overall (albeit less on average than in-building connections in my results).

[24] Dr. Rysman's alternative control for bandwidth, measured as the logarithm of bandwidth, is removed from the specification.

~~**CONFIDENTIAL]**~~ and on a sample limited to the most common providers and bandwidths (the three providers and six bandwidths for which fixed effects are included).[25] The results of estimation over the full sample are qualitatively similar to those that result from estimation over the sample limited to major providers and primary bandwidths, though fewer coefficients are significant statistically.[26] ~~**[END HIGHLY CONFIDENTIAL]**~~ Although both sets of results are reported in Table 1, the discussion will interpret only the results of estimation using the ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ major provider/primary bandwidth sample ~~**[END HIGHLY CONFIDENTIAL]**~~ (which are reported in columns 3, 4, 7 and 8).[27]

16. The results presented in columns 4 and 8, which use county fixed effects, ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ show that the price of high-bandwidth connections (defined as connections above 45 Mbps) decline with the presence of in-building rivals. Their presence has a negative and statistically significant effect on high bandwidth prices

[25] When the specification is estimated on the sample used by Dr. Rysman, additional fixed effects are included to account for all other providers (at every bandwidth) grouped together and all other bandwidths (for every provider) grouped together.

[26] Estimation over the sample limited to ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ major provider/primary bandwidth combinations improves precision by removing provider-bandwidth combinations with more limited observations. The estimated coefficients on variables accounting for rivalry did not change substantially (either in magnitude or statistical significance) when two provider-bandwidth combinations with small numbers of observations were excluded, and the four combinations involving these bandwidths with other providers or these providers with other bandwidths accounting for the most observations were included. ~~**[END HIGHLY CONFIDENTIAL]**~~

[27] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The connections in this sample account for 84% of total high-bandwidth connections. ~~**[END HIGHLY CONFIDENTIAL]**~~

(column 4). When incremental nearby providers are allowed to influence price individually (column 8), the presence of in-building rivals continues to have a statistically significant negative effect on price. Three of the four coefficients accounting for in-building rivals are negative and significant statistically (with the fourth negative but not significant statistically), and the cumulative effect of in-building providers is both negative and significant statistically. The cumulative effect measure (which sums the relevant coefficients),[28] shows that the effect of four or more in-building providers is to lower price by 26% (significant statistically).[29] ~~**[END HIGHLY CONFIDENTIAL]**~~

17. The county fixed effect regression reported in column 4 indicates that ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ the presence of nearby providers also has a negative and statistically significant effect on high-bandwidth prices. In the county fixed effect regression reported in column 8, the coefficients on the third and fourth (or more) nearby provider are negative and significant statistically, as is the cumulative effect of four or more nearby providers (estimated as a 23% reduction in price). All rivals

[28] As discussed in my prior submissions, in this data set inferences about market power from cumulative effects are likely more reliable than inferences from individual coefficients within those regressions. *E.g.*, Baker Supp. Reply Decl. ¶ 7.

[29] The percentage changes discussed in the text of my declaration are based on regression coefficients reported in Tables 1 and 2 that were converted into percentage changes using the formula: percentage change equals [exp(α)-1]*100, where α is the regression coefficient. (Because most coefficients are close to zero, the percentage changes are often approximately α*100.) Percentage changes for cumulative effects were computed from the sum of the coefficients reported in the table.

(in-building and nearby) cumulatively reduce price by an estimated 43% (significant statistically). ~~**[END HIGHLY CONFIDENTIAL]**~~

18. The results presented in odd-numbered columns 3 and 7, which use Census tract fixed effects, are consistent with the results of estimating using county fixed effects. As with the county fixed effects results, ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ in-building providers and nearby providers are found to reduce price in both equations. Neither of the relevant coefficients in the specification reported in column 3 is significant statistically. In the specification reported in column 7, two of the coefficients on incremental in-building rivals and the coefficient on the fourth nearby rival are negative and significant (with no coefficients positive and significant). The cumulative effect of all rivals (in-building and nearby), estimated as a 25% reduction in price, is also significant statistically. (The cumulative effect of in-building rivals, a 14% price decline, is significant statistically, while the cumulative effect of nearby rivals, also negative, is not significant statistically.[30])

19. The price effect of in-building rivals, nearby rivals, and all rivals apparent in these results provides empirical evidence that the ILECs exercise market power in high-bandwidth business data services connections. More generally, the empirical analyses presented here, in my

[30] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ While the cumulative in-building competition coefficient is not significant statistically, the inferred cumulative price effect of in-building rivals is found to be significant statistically using a test that accounts for the non-linear (exponential) transformation of the cumulative coefficient. ~~**[END HIGHLY CONFIDENTIAL]**~~

prior declarations, and in Dr. Rysman's report show that the presence of additional rivals, in-building or nearby, leads to lower prices. Although the regressions more reliably establish the exercise of market power than the specific contribution of each additional rival to lowering price, they suggest that every additional rival matters. Moreover, the price reduction associated with the fourth (or more) in-building provider and with the fourth (or more) nearby provider has practical economic significance and statistical significance in both the primary specification set forth in my initial declaration and the high-bandwidth specification presented in column 8 of Table 1 in this declaration. Hence, the full effect of rivalry on price likely requires (at least) four in-building providers and four nearby providers. ~~**[END HIGHLY CONFIDENTIAL]**~~

## B. Bandwidth Thresholds

20. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The competitive effects of rivalry on price at high bandwidths, as evident in the results reported in Table 1, do not depend on the threshold at which high bandwidth is defined. Table 2 provides empirical evidence from county fixed effect regressions similar to those reported in columns 4 and 8 of Table 1 that prices decline with increased in-building rivalry for connections above 50, 100, 200, and 700 Mbps (as well as connections above 45 Mbps, the

threshold used by Dr. Rysman),[31] though not for connections above 1 Gbps (where neither the coefficients on the presence of in-building rivals (top panel) nor the cumulative in-building coefficients (bottom panel) are significant statistically).[32]

21. These results suggest that the ILECs exercise market power at bandwidths above the 45 Mbps threshold used by Dr. Rysman to define high-bandwidth connections for his empirical analysis, and above the 50 Mbps benchmark put forward by the FCC as potentially separating bandwidths with less competition from those with competition sufficient to eliminate the need for regulation to control supracompetitive prices and other anticompetitive behavior.[33] These results are agnostic as to whether

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[31] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ All price effects representing in-building rivalry at these bandwidth thresholds are negative and significant statistically, except that for connections above 700 Mbps, both in-building price effect estimates are negative but only one is significant. ~~**[END HIGHLY CONFIDENTIAL]**~~

[32] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ In the corresponding Census tract fixed effect regressions, the analogous effects for presence or cumulative effect of in-building and nearby rivals are not significant statistically, though the cumulative effect for in-building and nearby rivalry combined is significant for bandwidths above 50 Mbps. ~~**[END HIGHLY CONFIDENTIAL]**~~

[33] FNPRM ¶¶ 162, 237, 244. **[BEGIN HIGHLY CONFIDENTIAL]** [redacted] **[END HIGHLY CONFIDENTIAL]**

the ILECs exercise market power at bandwidths above 1 Gbps.[34] ~~**[END HIGHLY CONFIDENTIAL]**~~

22. It is possible that nearby providers (as distinct from in-building rivals) matter more to competition at higher bandwidths than at lower bandwidths.[35] That suggestion is consistent in a general way with an entry analysis by Level 3 indicating that it is more likely to be profitable to build last-mile connections at higher bandwidths.[36] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ But neither the regression estimates presented in Table 2 nor the entry analysis reliably identifies a critical bandwidth level between 45 Mbps and 1 Gbps beyond which ease of entry reduces competitive concerns so much as to make regulation unnecessary.[37] Thus,

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[34] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ This result should not be interpreted as evidence against the exercise of market power at bandwidths above 1 Gbps. The 95% confidence intervals for cumulative effects at those bandwidths include substantial price reductions. ~~**[END HIGHLY CONFIDENTIAL]**~~ In addition, as discussed below in Section III.C, the bias in the data analysis against identifying an inverse relationship between prices and the number of rivals is likely greater at higher bandwidths.

[35] As indicated in my previous submissions, overall in-building providers likely provide a greater competitive constraint on ILEC retail pricing than do nearby providers. Baker Decl. ¶ 63. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ To similar effect, in the high-bandwidth results presented in Table 1, the presence of in-building providers generally has a greater price-reducing effect than the presence of nearby providers, and estimated the cumulative effect of in-building providers in reducing price is generally greater than the estimated cumulative effect of nearby providers. (The results reported in columns 1 and 5 are exceptions.). ~~**[END HIGHLY CONFIDENTIAL]**~~

[36] *See* Declaration of John Merriman on Behalf of Level 3 Communications, LLC, attached as an Appendix to Reply Comments of Birch Communications, Inc., EarthLink, Inc., and Level 3 Communications, LLC, WC Docket Nos. 16-143, 15-247, & 05-25, RM-10593 (filed June 28, 2016) (Merriman Decl.) (table indicating greater construction feasibility limits for higher bandwidth services than lower bandwidth services).

[37] Moreover, the entry evidence from Level 3 and Windstream indicates that entry would rarely be profitable at bandwidths at or below 100 Mbps. Merriman Decl. ¶ 6; Declaration of David Schirack and Mike Baer (June 28, 2016) (Windstream June Decl.) ¶¶ 16-18. Accordingly, ease of entry would not justify removing regulatory oversight at bandwidths at 100 Mbps or less.

neither provides a basis for assuming that bandwidths in that range should be free from regulatory oversight of prices, terms and conditions to prevent the anticompetitive exercise of market power. ~~**[END HIGHLY CONFIDENTIAL]**~~

## C. Direction of Biases in the Estimated Coefficients

23. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The regression results for high-bandwidth connections set forth in Table 1 support the conclusion that ILECs exercise market power in providing high-bandwidth business data services. That conclusion is further buttressed by an analysis of the likely direction of biases in estimating a relationship between price and the number of rivals in the FCC's business data services data. ~~**[END HIGHLY CONFIDENTIAL]**~~

24. As discussed in detail in my previous declarations, each additional rival is likely associated with a greater reduction in ILEC prices than measured by the regression equations for six reasons: unobservable customer heterogeneity, unobservable impediments to CLEC expansion, errors in measuring the price of dedicated services, multi-year ILEC contracts, unobservable wholesale switching costs, and ILEC wholesale

pricing policies.[38] Theoretical possibilities that missing price data would bias the results in the opposite direction can be rejected based on empirical tests,[39] and the theoretical possibility that the endogeneity of entry would bias the results in the opposite direction can be rejected as unlikely to be important practically because it has been largely controlled for in the empirical analysis.[40]

25. Moreover, two of the factors tending to suppress an inverse relationship between rivalry and price in the regression results may grow more important as bandwidth increases. First, as I explained in a previous declaration, the bias resulting from unobservable customer heterogeneity may be greater at higher bandwidths because customers purchasing higher bandwidth business data services connections may tend to buy more complex managed services, and those that need more complex managed services would tend to value business data services more.[41] Second, retail prices in the business data services data may tend to incorporate greater measurement error when the customer is purchasing managed services along with business data services, which again may be more likely at

[38] Baker Decl. ¶¶ 68-94.

[39] Baker Supp. Reply Decl. ¶¶ 15-16.

[40] Baker Supp. Reply Decl. ¶¶ 19-21; Baker 2d Supp. Reply Decl. ¶¶ 10-17.

[41] Baker Decl. ¶ 75.

higher bandwidths, increasing the difficulty of isolating the relationship between prices and rivals in the data set.[42]

26. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ Accordingly, the likely direction of the bias in the regression results – against finding an inverse relationship between price and rivalry – adds further support to the conclusion that ILEC prices tend to fall as the number of rivals increases, including at high bandwidths. ~~**[END HIGHLY CONFIDENTIAL]**~~

## D. Location of Hybrid Fiber-Coaxial Ethernet Networks

27. The validity of the estimation results I have presented, including ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ those set forth in Table 1 of this declaration and ~~**[END HIGHLY CONFIDENTIAL]**~~ those presented in my prior declarations, is not called into question by the data on the location of hybrid fiber-coaxial (HFC) networks capable of providing Ethernet connections during 2013 that was recently submitted by several cable providers.[43] The new cable data does not add any new business data

[42] *See* Baker Decl. ¶ 89.

[43] Letter from Matthew H. Brill, Counsel for Comcast Corp., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25 (June 1, 2016) (Comcast Letter); Letter from Samuel L. Feder, Counsel for Charter Comm'ns, Inc., to Marlene H. Dortch, Secretary, FCC, WCC Docket No. 05-25 (May 27, 2016) (Charter Letter); Letter from Michael H. Pryor, Counsel for Cox Comm'ns, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25 (May 18, 2016) (Cox Letter); Letter from Matthew H. Brill, Counsel for Time Warner Cable Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 05-25 (May 12, 2016) (Time Warner Cable Letter).

services connections to the FCC's business data services data. Nor does it identify any new locations served by fiber-based providers. It merely identifies Census blocks where the cable provider was capable of offering low-bandwidth (up to 10 Mbps symmetrical) Ethernet services over its HFC network.[44]

28. Ethernet service provided over HFC networks were appropriately excluded from a business data services product market during 2013, the year covered by the FCC's business data services data, because they were not substitutes for business data services. They were not offered with Service Level Agreements (SLAs) comparable to those offered to business data services customers (*e.g.*, with comparable performance objectives for availability, latency, jitter, and packet loss).[45] For this reason, HFC Ethernet connections are properly excluded from the data set used for the regression analysis presented in this declaration and my earlier declarations, and it is unnecessary to account for them in any empirical analyses relating business data services pricing to the extent of rivalry.

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[44] Cox, Charter, and Time Warner Cable provided these data to the FCC by Census block. Comcast identified building addresses, which the FCC used to identify Census blocks for inclusion in the data file it made available for statistical analysis.

[45] *E.g.*, **[BEGIN HIGHLY CONFIDENTIAL]** [redacted] **[END HIGHLY CONFIDENTIAL]** *See* Declaration of Dan Deem, Douglas Derstine, Mike Kozlowski, Arthur Nichols, Joe Scattareggia, and Drew Smith, ¶ 30 (Jan. 22, 2016) (attached to Comments of Windstream Services, LLC, WC Docket No. 05-25, RM-10593 (filed Jan. 27, 2016) (refiled Apr. 20, 2016)) (Windstream Jan. Decl.) (indicating that no cable provider offers SLAs with adequate performance assurances for connections over coaxial cable or HFC).

29. Even if HFC Ethernet connections had been identified as business data services connections, doing so would have been unlikely to have changed any of the conclusions reached in my empirical analysis. The availability of HFC Ethernet connections is unlikely to have mattered to business data services customers considering high-bandwidth connections: HFC Ethernet connections have a maximum symmetrical bandwidth of 10 Mbps.[46] To the extent these connections nevertheless were viewed as substitutes by business data services customers in 2013, moreover, their availability is controlled for to some extent by the location fixed effects used in the regressions.[47]

30. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ An empirical test confirms that HFC Ethernet connections do not have any competitive significance at high bandwidths, and only limited significance at lower bandwidths. For high-bandwidth connections, the specifications underlying the results presented in the eight columns of Table 1 were modified to include a variable accounting for the presence of cable providers offering HFC Ethernet in a Census block that were not otherwise identified as an in-

[46] *See* FNPRM ¶ 62 (Ethernet services with symmetrical speeds in excess of 10 Mbps with performance guarantees are not available to users connected to cable operators' HFC networks).

[47] TWC **[BEGIN HIGHLY CONFIDENTIAL]** [redacted] **[END HIGHLY CONFIDENTIAL]** indicate that in 2013 they were capable of offering HFC Ethernet across their entire service footprints. Time Warner Cable Letter at 1; **[BEGIN HIGHLY CONFIDENTIAL]** [redacted] **[END HIGHLY CONFIDENTIAL]**.

building or nearby rivals.[48] In every case, this variable had a small positive coefficient near zero (less than 0.01), not significant statistically.[49] In addition, including this variable did not materially change the estimated coefficient on any variable accounting for the competitive effect of in-building or nearby providers.[50]

31. For DS1 and DS3 connections, a similar variable accounting for HFC Ethernet was added to specifications similar to those reported in Table 1.[51] These variables generally showed that the presence of HFC Ethernet reduces ILEC prices by between 2% and 5% (in most cases significant statistically). Again, including this variable did not materially change the estimated coefficient on any variable accounting for rivalry.[52]

32. These empirical results provide no basis for identifying a competitive constraint from HFC Ethernet providers at high bandwidths

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[48] The variable was constructed by identifying Census blocks in which the cable provider had HFC Ethernet available, and removing the Census block if the cable provider was previously identified as providing a connection in the block or as having a fiber network in the block.

[49] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The estimated standard errors were between 0.01 and 0.02, so the absence of statistical significance was not an artifact of having a small number of observations. A cable provider offering HFC Ethernet in the Census block and not otherwise identified as a rival was present for about 33% of the observations in the limited high-bandwidth sample and 37% of all high-bandwidth observations. ~~**[END HIGHLY CONFIDENTIAL]**~~

[50] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ All coefficients accounting for the competitive effect of rivals changed by less than 0.001. ~~**[END HIGHLY CONFIDENTIAL]**~~

[51] The variables accounting for nearby providers included all facilities-based providers (following the approach Dr. Rysman employed in his Table 19). The variable accounting for HFC Ethernet competition was constructed by identifying Census blocks in which the cable provider had HFC Ethernet available, and removing the Census block if the cable provider was previously identified as providing a connection in the block.

[52] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ All coefficients accounting for the competitive effect of rivals changed by less than 0.001. ~~**[END HIGHLY CONFIDENTIAL]**~~

(45 Mbps and above), and they indicate that the competitive constraint an HFC Ethernet provider offers at lower bandwidths is small.[53] Their inclusion has no material effect on the estimates of the competitive significance of in-building and nearby rivalry. Accordingly, the new cable data does not alter the conclusion reached in this declaration and my prior declarations that ILEC prices tend to decline as rivalry increases, and that every additional competitor through at least the fourth in-building rival and the fourth nearby rival likely contributes to reducing ILEC prices and helps constrain the exercise of ILEC market power. ~~**[END HIGHLY CONFIDENTIAL]**~~

## V. Conclusion

33. In my original declaration in this proceeding, I concluded that ILECs are likely able to exercise market power in the provision of business data services, and would be expected to charge prices above competitive levels unless prevented by regulation. This conclusion was based on an analysis of the structure of business data services markets, and was consistent with my empirical analysis of the business data services data, which indicates that ILEC prices are lower when CLECs compete with them and that those prices tend to decline as the number of business data

[53] ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ These results also show that empirical analyses of ILEC pricing of business data services that do not account for the presence of HFC Ethernet are not unreliable for that reason. ~~**[END HIGHLY CONFIDENTIAL]**~~

services rivals increases. ~~**[BEGIN HIGHLY CONFIDENTIAL]**~~ The additional analyses, empirical and otherwise, presented in this declaration provide further support for these conclusions. ~~**[END HIGHLY CONFIDENTIAL]**~~

~~[BEGIN HIGHLY CONFIDENTIAL]~~

## Table 1

# High-Bandwidth Connections

| | (1) Census Tract FE | | (2) County FE | | (3) Census Tract FE Major Providers and Common Bandwidths | | (4) County FE Major Providers and Common Bandwidths | |
|---|---|---|---|---|---|---|---|---|
| | Estimate | Std. Err. | Estimate | Std. Err. | Estimate | Std. Err. | Estimate | Std. Err. |
| One or more in-building rivals | -0.017 | (0.0151) | -0.062* | (0.0096) | -0.033 | (0.0168) | -0.087* | (0.0106) |
| One or more in-block high-bandwidth rivals | -0.022 | (0.0222) | -0.022 | (0.0134) | -0.025 | (0.0261) | -0.072* | (0.0145) |
| Adjusted R-Squared | 0.512 | | 0.4 | | 0.521 | | 0.408 | |
| Observations | 77,089 | | 77,089 | | 64,694 | | 64,694 | |

Notes: Dependent variable is the logarithm of price.
Robust standard errors in parentheses.
All regressions include the same set of control variables as Dr. Rysman's analysis except for the logarithm of bandwidth; additionally, all regressions include the interactions between fixed effects for providers (AT&T, CenturyLink, Verizon, and Other) and fixed effects for bandwidth speeds (50 Mbps, 100 Mbps, 155.52 Mbps, 200 Mbps, 622.08 Mbps, 1 Gbps or greater, and Other). Specifications in columns 3, 4, 7, and 8 are limited to major providers (AT&T, CenturyLink, and Verizon) and primary bandwidths (50 Mbps, 100 Mbps, 155.52 Mbps, 200 Mbps, 622.08 Mbps, and 1 Gbps or greater).
* indicates the coefficient is statistically significant at the 5% level

~~[END HIGHLY CONFIDENTIAL]~~

~~[BEGIN HIGHLY CONFIDENTIAL]~~

**Table 1 (continued)**

# High-Bandwidth Connections

| | (5) Census Tract FE | | (6) County FE | | (7) Census Tract FE Major Providers and Common Bandwidths | | (8) County FE Major Providers and Common Bandwidths | |
|---|---|---|---|---|---|---|---|---|
| | Estimate | Std. Err. | Estimate | Std. Err. | Estimate | Std. Err. | Estimate | Std. Err. |
| First in-building rival | -0.034* | (0.0171) | -0.049* | (0.0110) | -0.049* | (0.0188) | -0.068* | (0.0121) |
| Second in-building rival | 0.036 | (0.0263) | -0.052* | (0.0171) | 0.021 | (0.0294) | -0.080* | (0.0190) |
| Third in-building rival | -0.091* | (0.0364) | -0.009 | (0.0192) | -0.124* | (0.0398) | -0.02 | (0.0203) |
| Fourth (or more) in-building rival | 0.012 | (0.0321) | -0.107* | (0.0214) | -0.004 | (0.0349) | -0.132* | (0.0232) |
| First in-block high-bandwidth rival | -0.036 | (0.0239) | 0.044* | (0.0148) | -0.022 | (0.0280) | 0.019 | (0.0161) |
| Second in-block high-bandwidth rival | 0.026 | (0.0267) | 0.016 | (0.0162) | 0.021 | (0.0307) | -0.013 | (0.0173) |
| Third in-block high-bandwidth rival | -0.043 | (0.0288) | -0.039* | (0.0174) | -0.041 | (0.0329) | -0.091* | (0.0188) |
| Fourth (or more) in-block high-bandwidth rival | -0.055* | (0.0275) | -0.095* | (0.0157) | -0.085* | (0.0315) | -0.173* | (0.0171) |
| Adjusted R-Squared | 0.512 | | 0.401 | | 0.521 | | 0.41 | |
| Observations | 77,089 | | 77,089 | | 64,694 | | 64,694 | |
| Cumulative in-building rivals | -0.077 | (0.073) | -0.217* | (0.045) | -0.156 | (0.081) | -0.301* | (0.049) |
| Cumulative in-block high-bandwidth rivals | -0.108 | (0.091) | -0.075 | (0.054) | -0.128 | (0.106) | -0.259* | (0.058) |
| Cumulative rivals | -0.185 | (0.122) | -0.292* | (0.072) | -0.284* | (0.138) | -0.56* | (0.077) |

Notes: Dependent variable is the logarithm of price.
Robust standard errors in parentheses.
All regressions include the same set of control variables as Dr. Rysman's analysis except for the logarithm of bandwidth; additionally, all regressions include the interactions between fixed effects for providers (AT&T, CenturyLink, Verizon, and Other) and fixed effects for bandwidth speeds (50 Mbps, 100 Mbps, 155.52 Mbps, 200 Mbps, 622.08 Mbps, 1 Gbps or greater, and Other). Specifications in columns 3, 4, 7, and 8 are limited to major providers (AT&T, CenturyLink, and Verizon) and primary bandwidths (50 Mbps, 100 Mbps, 155.52 Mbps, 200 Mbps, 622.08 Mbps, and 1 Gbps or greater).
* indicates the coefficient is statistically significant at the 5% level



~~[END HIGHLY CONFIDENTIAL]~~

[BEGIN HIGHLY CONFIDENTIAL]

[redacted]

[END HIGHLY CONFIDENTIAL]

I declare under penalty of perjury that the foregoing is true and correct to the best of my information and belief.

_____ Executed on June 28, 2016

Jonathan B. Baker