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**REDACTED – FOR PUBLIC INSPECTION**

December 8, 2014

**VIA ELECTRONIC FILING**

Marlene H. Dortch
Federal Communications Commission
Office of the Secretary
445 Twelfth Street, S.W.
Washington, D.C. 20554

**Re:** ***Applications of Comcast Corp., Time Warner Cable Inc., Charter Communications, Inc., and SpinCo for Consent to Assign or Transfer Control of Licenses and Authorizations,*** **MB Docket No. 14-57**
**REDACTED – FOR PUBLIC INSPECION**

Dear Ms. Dortch:

In connection with the above-captioned proceeding, Comcast Corporation ("Comcast") hereby submits the enclosed analysis prepared by Compass Lexecon regarding Comcast's interconnection capacity and utilization rates (Appendix A). This analysis was referenced in Comcast's recent Responses to Commission staff Question Nos.1 and 3 filed on November 26, 2014.[1] Comcast also submits herewith an analysis prepared by Cornerstone Research of the correlation between average revenue per unit ("ARPU") and Comcast's programming costs (Appendix B). This analysis was referenced in Responses to Commission staff Question Nos. 2 and 6 in the November 26 filing.[2]

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1 *See* Letter from Kathryn A. Zachem, Comcast Corporation, to Marlene H. Dortch, FCC, MB Docket No. 14-57, Responses to Question Nos. 1 & 3 (Nov. 26, 2014) ("November 26 Responses" or "Responses").

2 *See* November 26 Responses, Responses to Question Nos. 2 & 6.

* * *

In Exhibit 66.1 of Comcast's Response to the Commission's Information Requests, Comcast identified 44 current settlement-free routes into its network.[3] In response to questions raised at a meeting held with Commission staff and Kevin McElearney on October 30, 2014, Mr. McElearney stated and Comcast confirmed in its ex parte letter that

> [W]hile not every one of [Comcast's] current settlement-free peers sells wholesale transit to Comcast's network, many do. As Mr. McElearney noted in his declaration, Comcast's settlement-free peers include a few providers of Root DNS services, such as ISC (Internet Systems Consortium), that are a critical part of the Internet infrastructure but do not run backbone or access services. Mr. McElearney confirmed that the largest of Comcast's settlement-free peers – in addition to certain of Comcast's international peers with a presence in the U.S. – sell wholesale transit to Comcast's network within the United States, and it would be feasible for others to do so if they so choose.[4]

In the Responses filed on November 26, 2014, Comcast similarly noted that most of Comcast's settlement-free peers can or do sell transit services.[5]

As noted in Mr. McElearney's declaration and Comcast's November 3, 2014 ex parte letter, for purposes of analyzing which of its settlement-free peers sell wholesale transit services, it is reasonable to exclude the following non-commercial settlement-free peers:

- **{{**
- 
- **}}**

For purposes of assisting Compass Lexecon in its analysis of how much capacity was available into Comcast's network via settlement-free routes that offer wholesale transit services, counsel for

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[3] *See* Letter from Kathryn A. Zachem, Comcast Corporation, to Marlene H. Dortch, FCC, MB Docket No. 14-57, Comcast Information Request Response, Exhibit 66.1 (Sept. 11, 2014). Forty-five entries were included in this list, but one – Internet Systems Consortium – is a duplicate entry (with two ASNs), hence there are 44 routes.

[4] *See* Letter from Kathryn A. Zachem, Senior Vice President, Regulatory and State Legislative Affairs, Comcast Corp., to Marlene H. Dortch, Secretary, FCC, MB Docket No 14-57, at 3 (Nov. 3, 2014) (internal citation and related text omitted).

[5] *See* November 26 Responses, Response to Question No. 1 at 18-19 & n.61 and Response to Question No. 3 at 5-6 & n.18.

Comcast suggested that the economists omit the following settlement-free peers from their assessment, based on Comcast's understanding that they likely do not currently sell wholesale transit services:

- **{{**
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- **}}**[6]

Notably, however, whether or not these entities sell wholesale transit today, Comcast believes that they are technically capable of doing so and might in fact do so if a potential customer presented a compelling sales opportunity.

In all events, omitting these nine settlement-free peers and their routes makes little difference to the overall analysis. In total, these peers (and their routes) together constitute only a small fraction of settlement-free peering capacity available into Comcast's network (approximately **{{ }}** percent on average during the relevant period, and less than that during the most recent month of data analyzed (June 2014))[7] and an even smaller percentage of overall capacity available via all routes that sell access to Comcast's network, including CDNs.

* * *

Comcast submits herewith the redacted, public version of this filing. The **{{ }}** symbols denote where Highly Confidential Information has been redacted. A Highly Confidential version of this filing

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[6] In part because Comcast does not actively purchase wholesale transit services, Comcast's information about the transit marketplace is limited. Comcast believes, however, that wholesale transit services are available (or, if not currently available, could readily be made available) via the remaining 35 settlement-free routes.

[7] Compass Lexecon's settlement-free capacity analysis does not include one other settlement-free peer identified in Exhibit 66.1 – **{{**
**}}** and capacity data for this peer was not available during the relevant period analyzed by Compass Lexecon (July 2013-June 2014). Thus, Compass Lexecon used a list of 34 settlement-free routes in conducting the enclosed capacity analysis, which is included in the Highly Confidential backup data being submitted today (*see* "SFI List.xlsx.").

and a CD-ROM containing data files supporting these analyses have been submitted to the Office of the Secretary under separate cover and will be made available pursuant to the terms of the Modified Joint Protective Order in effect in this proceeding.[8]

Please contact the undersigned should you have any questions regarding this matter.

Respectfully submitted,

*/s/ Francis M. Buono*
Francis M. Buono
*Counsel for Comcast Corporation*

Enclosures

[8] *Applications of Comcast Corp. and Time Warner Cable Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations*, Second Amended Modified Joint Protective Order, MB Docket No. 14-57, DA 14-1639 (Nov. 12, 2014) ("Modified Joint Protective Order").

# Appendix A

## Comcast's Interconnection Capacity and Utilization Rates

**December 8, 2014**

1. In his declaration,[1] Kevin McElearney, Senior Vice President, Network Engineering at Comcast Cable, stated that "Comcast's utilization with its peers during the last 12 months was less than {{ }} percent on average during peak times – and those peers do not pay Comcast."[2] Furthermore, Mr. McElearney also explained that:

> Netflix appears to have adopted a self-serving strategy of using limited transit providers that never purchase interconnection services from their destination ISP. The result of this self-imposed limitation is that many transit suppliers with available capacity and potentially comparable market pricing were excluded from Netflix's consideration. This Netflix transit strategy severely limited Netflix's . . . ability to deliver a high-quality service.[3]

2. In this analysis, we confirm that Mr. McElearney's calculations are accurately derived from Comcast's interconnection data.

3. To test the "less than {{ }} percent" figure, we estimated average utilization between 7/2013 and 6/2014 by taking the sum of the monthly 95th percentile inbound traffic on all of the settlement-free interconnection ("SFI") paths into Comcast's network and dividing by the sum of the monthly capacity allocated to these paths. This metric, which is equivalent to the weighted average utilization across all the settlement-free paths (weighted by the capacity of each path), yields a utilization rate of {{ }} percent, consistent with Mr. McElearney's finding.

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1 Comcast Corporation and Time Warner Cable Inc., Opposition to Petitions to Deny and Response to Comments, Exhibit 4, Declaration of Kevin McElearney, MB Docket No. 14-57 (Sept. 23, 2014) ("McElearney Decl.").

2 McElearney Decl. ¶¶ 3, 36.

3 McElearney Decl. ¶¶ 23, 24.

4. We have also confirmed that there was available capacity into Comcast's network via settlement-free and content distribution network ("CDN") paths sufficient to handle all Netflix traffic during this period. By its own account, Netflix sent traffic to Comcast over only three of Comcast's settlement-free peers: Cogent, Level 3, and Tata.[4] We find that the utilization rate on other settlement-free and CDN networks was substantially lower than on these three networks. Figure 1 shows that, while the average of the utilization rates on Cogent, Level 3, and Tata paths between 7/2013 and 3/2014 was above {{ }} percent, the utilization on the other (i.e., non-Cogent/Level 3/Tata) settlement-free paths was generally below {{ }} percent, and the utilization on large CDN paths (comprising large CDNs including {{

}}) varied around {{ }} percent.[5]

[4] Petition to Deny of Netflix Inc., Declaration of Ken Florance ¶ 48, MB Docket No. 14-57 (Aug. 25, 2014).

[5] Between 7/2013 and 3/2014, the average utilization rate on Netflix selected networks was as follows: Cogent, {{ }} percent; Level 3, {{ }} percent; and Tata, {{ }} percent. In contrast, the average utilization rate on other (i.e., non-Cogent/Level 3/Tata) settlement-free networks was {{ }} percent, and the average utilization rate on the large CDN networks was as follows: {{

}}.

**Figure 1: 95th Percentile Inbound Utilization for Cogent/Tata/Level 3 versus Utilization for CDNs and SFI Routes**

{{

}}

5. Figure 2 plots the sum of the 95th percentile inbound usage on Cogent, Level 3, and Tata paths between 7/2013 and 6/2014, as well as the 95th percentile inbound usage on Netflix's paths subsequent to its direct interconnection arrangement with Comcast in 3/2014, both relative to the aggregate available capacity on all settlement-free and large CDN paths into Comcast's network between 7/2013 and 6/2014. The available capacity into Comcast's network was in fact substantially larger than the actual usage on the three networks that Netflix utilized to connect to Comcast in late 2013/early 2014, further demonstrating that Netflix could have routed around the congested paths.

**Figure 2: 95th Percentile Inbound Usage for Netflix and Cogent/Tata/Level 3 versus Excess (Unutilized) Capacity for CDNs and SFI Routes**

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6. The figure also shows that Netflix's traffic on Comcast's network increased dramatically after it interconnected directly with Comcast in 3/2014, and that the excess capacity in Comcast's network continues to be substantial in the period after the direct interconnection. Thus, the disintermediation of Cogent and direct interconnection with Netflix has increased both Netflix's output on the Comcast network and the overall capacity of Comcast's network.

# Appendix B

# Analysis of Correlation between ARPU and Programming Costs of Comcast Cable Video Service

**December 8, 2014**

In response to questions about the likelihood of pass-through of any potential programming costs savings that Comcast could achieve as a result the transaction, we have analyzed the correlation between Comcast's programming costs and average revenue per user ("ARPU") for video customers in the past 10 years (2004 – 2013). This analysis tests empirically whether what Comcast charges its video customers tends to change in response to changes in programming costs. The ARPU and programming cost data per month per video subscriber, shown in the table below, are obtained from Comcast's annual and semi-annual financial filings.[1]

## Comcast ARPU and Programming Costs per Month per Video Subscriber

2004 – 2013

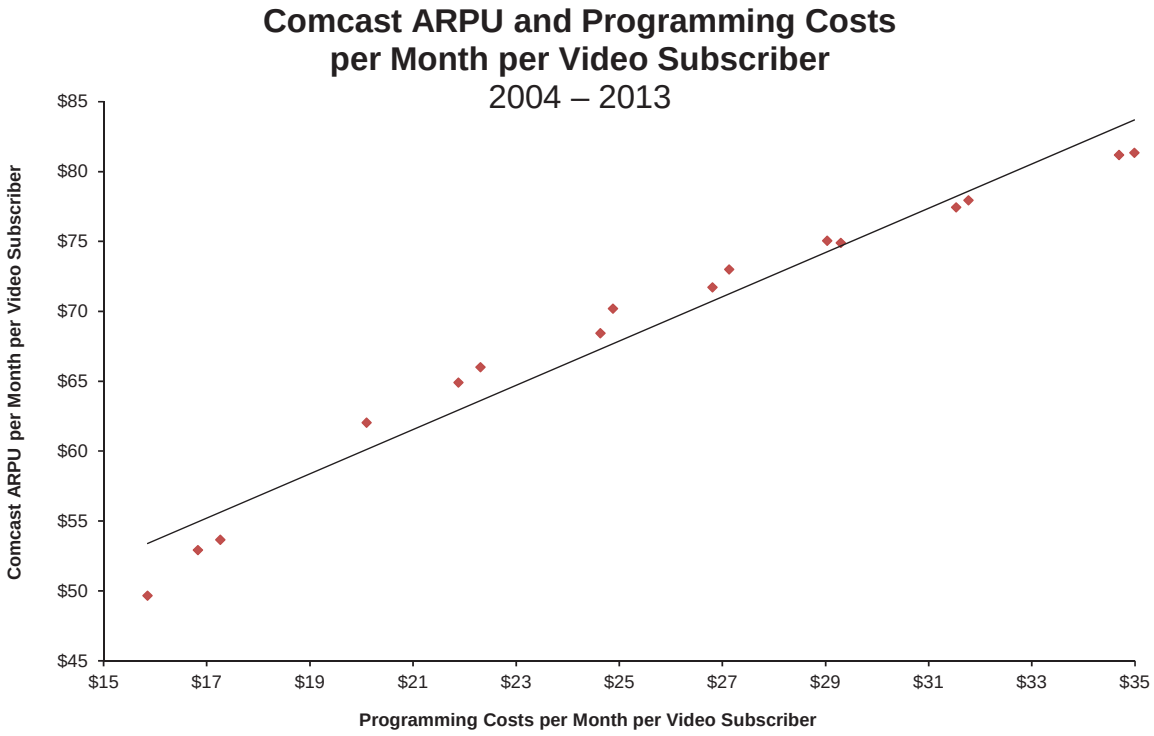
| Report Period | Programming Costs per Month per Video Subscriber | ARPU per Month per Video Subscriber |
|---|---|---|
| Jan - Dec 13 | $34.99 | $81.34 |
| Jan - Jun 13 | $34.69 | $81.18 |
| Jan - Dec 12 | $31.77 | $77.93 |
| Jan - Jun 12 | $31.54 | $77.44 |
| Jan - Dec 11 | $29.30 | $74.88 |
| Jan - Jun 11 | $29.04 | $75.04 |
| Jan - Dec 10 | $27.13 | $72.99 |
| Jan - Jun 10 | $26.81 | $71.70 |
| Jan - Dec 09 | $24.88 | $70.18 |
| Jan - Jun 09 | $24.64 | $68.43 |
| Jan - Dec 08 | $22.31 | $65.98 |
| Jan - Jun 08 | $21.88 | $64.89 |
| Jan - Dec 07 | $20.10 | $62.03 |
| Jan - Dec 06 | $17.26 | $53.64 |
| Jan - Dec 05 | $16.83 | $52.90 |
| Jan - Dec 04 | $15.85 | $49.64 |

Source: Comcast *SEC Filings*

Note: ARPU per month per video subscriber is calculated as video revenue divided by end-of-the-period video subscribers mutiplied by the number of months that revenue is reported for. Because the reported revenue is specific to residential subscribers starting December 2009, the number of subscribers for each year is adjusted by multiplying the percentage of residential video subscribers out of total video subscribers.

[1] For 2004 to 2007, data on ARPU and average programming costs per month were available at the annual level from Comcast's 10-Ks. For 2008 to 2013, ARPU and programming cost data were available at the semi-annual and annual level from Comcast's 10-Qs and 10-Ks.

The analysis finds a very high correlation between Comcast's programming costs and ARPU from video customers, as shown in the chart below, with a correlation coefficient of 0.98 (the highest possible value is 1). This correlation holds whether we use annual data only or include semi-annual data as well. If, using annual data, we regress growth rate of ARPU on growth rate of programming costs (and a constant), the coefficient on the growth rate of programming costs is 0.89, implying that a 1 percentage point change in programming costs is associated with a 0.89% percentage change (in the same direction) in ARPU. If we combine semi-annual data and annual data, the regression coefficient is 0.678.




Source: Comcast *SEC Filings*

Note: ARPU per month per video subscriber is calculated as video revenue divided by end-of-the-period video subscribers mutiplied by the number of months that revenue is reported for. Because the reported revenue is specific to residential subscribers starting December 2009, the number of subscribers for each year is adjusted by multiplying the percentage of residential video subscribers out of total video subscribers.

Because ARPU may be affected by many other factors, such as the quality of programming and number of channels, one cannot conclude just based on the analysis above that there is a causal relationship between the change in programming costs and change in ARPU.

However, the analysis suggests that Comcast's ARPU and programming costs tend to move together, as basic economics predicts that they should.[2]

Combining the empirical evidence and basic economics, it is reasonable to conclude that merger-related programming cost savings would be passed through to consumers fully or partially.

[2] According to basic economics, firms generally pass through part or all of a change in marginal cost. Even a monopolist will pass through part of a reduction of marginal cost. (See, e.g., Hal Varian, *Microeconomic Analysis*, 3rd Ed., pp. 236–237.) Programming cost is a marginal cost, as it is typically assessed on a per-subscriber basis. Therefore, basic economics suggests that Comcast will pass through at least part of its programming cost changes to consumers. The pass-through may happen in a number of ways, including slower growth in retail price, better network infrastructure, a larger number of channels, and more and better advanced digital services, among others. (See Rosston-Topper Initial Declaration ¶ 197.)