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REDACTED – FOR PUBLIC INSPECTION

March 15, 2016

By ECFS

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: Applications of Charter Communications, Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership for Consent to Assign or Transfer Control of Licenses and Authorizations, MB Docket No. 15-149

Dear Ms. Dortch:

In accordance with the *Protective Order* in the above-captioned proceeding,[1] DISH Network Corporation ("DISH") hereby submits the attached redacted version of the enclosed Supplemental Declaration of DISH's economic expert William P. Zarakas. DISH has denoted with "**{{BEGIN HCI END HCI}}**" symbols where Highly Confidential Information has been redacted. The designated Highly Confidential Information in the declaration was taken from or derived from Confidential and Highly Confidential Information in the Applicants' filings and submissions to the Commission in response to the Commission's Information Requests. A Highly Confidential version of this declaration is being simultaneously filed with the Commission.

[1] *Applications of Charter Communications, Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership for Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 15-149, *Protective Order*, FCC 15-110 (Sept. 11, 2015) ("*Protective Order*").

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Please contact me with any questions.

Respectfully submitted,

Pantelis Michalopoulos
Stephanie A. Roy
Counsel to DISH Network Corporation

Enclosure

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Supplemental Declaration of William P. Zarakas

1. My name is William P. Zarakas. As I stated in my January Declaration in the above-captioned proceeding,[1] I am a Principal with the Brattle Group, an economics consulting firm, where I work primarily on economic and regulatory matters concerning the communications and energy industries. I have been involved in the economic analysis of issues facing these industries for roughly 30 years. I have provided reports and/or testimony before the Federal Communications Commission, the Federal Energy Regulatory Commission, the Securities and Exchange Commission, the Copyright Royalty Judges (Library of Congress), the U.S. Congress, state regulatory agencies, arbitration panels, foreign governments and courts of law.

2. I have worked extensively on matters concerning: costs, prices and rates for utility and telecommunications services; business and asset valuations, including the valuation of wireless spectrum; the impacts of mergers on markets and upon costs of service; the determination of royalties and the distribution of cable and satellite television retransmission fees to content providers; the value of reliability in utility services; and the impact of disruptive technologies on regulated industries, most recently involving the effect of distributed energy resources on utility costs and rates. Prior to my tenure with The Brattle Group, I held senior positions at other economic and management consulting firms.

3. I have submitted a Declaration to the Commission in connection with the proposed merger of Charter Communications, Inc., Time Warner Cable Inc., and Advance/Newhouse Partnership.[2] In that Declaration I concluded that **{{BEGIN HCI**

END HCI}}.[3] I have since conducted additional analyses that reinforce and strengthen this conclusion. Regression analyses conducted at a more detailed level (i.e., at the zip code level) indicate **{{BEGIN HCI**

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[1] Declaration of William P. Zarakas, Analysis of Internet Churn: Time Warner Cable, Bright House Networks and Charter Communications, MB Docket No. 15-149 (Jan. 20, 2016) ("January Declaration") (attached to Letter from Pantelis Michalopoulos, Counsel to DISH Network Corp., to Marlene Dortch, FCC, MB Docket No. 15-149 (Jan. 20, 2016)).

[2] *Id.*

[3] **{{BEGIN HCI**

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Discussion

4. The regressions in my Declaration were specified as follows:

   (i) The outcome (or dependent) variable was defined to be monthly voluntary residential broadband churn. I ran the regression using both total voluntary residential broadband churn and standalone voluntary residential broadband churn as the outcome variable;

   (ii) an explanatory (or independent) variable indicative of Netflix download speed (as a "throttle" variable), was set as a dummy equal to 1 during the period from November 2013 to February 2014 in Regression Set 1, or actual Netflix download speed, in Mbps, in Regression Set 2;

   (iii) additional independent variables were set as the month and year, which measure any general time trends in voluntary residential broadband churn; and

   (iv) a third independent variable was set as TWC's corresponding voluntary residential broadband churn rate 12 months earlier to account for systematic seasonal variations in voluntary churn.

5. I included the two sets of regressions in my January Declaration. In Regression Set 1, the Netflix speed variable was a dummy variable, set equal to 1 during the "throttle" period (from November 2013 to February 2014). In Regression Set 2, the Netflix speed variable was set equal to the average monthly speed (in Mbps) of Netflix's traffic on TWC's network. I have revised the regression results slightly from those included in my January Declaration. The revised results are provided in Table 1. The revised results included in the table reflect an adjustment to the coding of Netflix download speed data used in the regressions.[4] Table 1 indicates that the Netflix speed dummy variable remains {{BEGIN

[4] Specifically, I excluded the Netflix speed variable for the period before November 2012. Netflix did not publish its download speed index before that date. In my January Declaration the average

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HCI END HCI}}. However, the actual Netflix speed variable is now {{BEGIN HCI END HCI}}. This change is due to the fact that the Netflix speed variable trends upward consistently over the reported period, capturing a time trend on its own. After controlling for this time trend captured by the Netflix speed variable the actual time trend independent variable {{BEGIN HCI END HCI}}.

6. The supplemental analysis I have conducted affords additional insight into the relationship between the Netflix speed variable and voluntary churn was facilitated through the supplemental analysis requested by FCC Staff. First, I revised the regression analysis by excluding the time trend variable. The results for such a regression are provided in Table 2. The results in Table 2 are similar to those presented in Table 1. In both cases, the Netflix speed dummy variable is {{BEGIN HCI END HCI}}. However, in Tables 1 and 2 the actual Netflix speed variable is {{BEGIN HCI END HCI}}. The results highlight the role of general trend variables in a regression analysis. Specifically, actual Netflix speeds move over time (increasing from 2.12 Mbps in November 2012 to 3.53 Mbps in August 2015), which reflect overall linear trends. As discussed above, this trending speed variable effectively negates the need for including a linear trend variable in the regressions.

7. I have also run an additional set of regressions in which the voluntary churn for (i) video, (ii) phone and (iii) total customer churn across all six service bundles[5] were the dependent variable. The results for these regressions are shown in Table 3. The results indicate that the Netflix Speed variable is {{BEGIN HCI END HCI}}. For total voluntary churn, the Netflix Speed variable is {{BEGIN HCI END HCI}}.

8. I have run the regressions using a larger data set, specifically encompassing churn data at the zip code level. This increased the number of observations. However, even though churn data were available at the disaggregate zip code level, Netflix download speeds were not (i.e., they were only available on an average system wide basis). The results for these regressions are shown in Table 4. The table indicates the coefficient on the Netflix Speed dummy variable (in Regression Set 1) is {{BEGIN HCI

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monthly speed of Netflix's traffic on TWC's network was coded as "0" for the period from June 2012 to October 2012 instead of as missing. I fix this coding issue in Table 1.

[5] The six service bundles are: internet standalone, phone standalone, video standalone, video and phone, video and internet, internet and phone, and triple play (e.g., video, phone, and internet).

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END HCI}}. The table also indicates that the results {{BEGIN HCI

END HCI}}.[6]

9. I have run an additional set of regressions with the dependent variable defined to be the difference between voluntary internet churn and voluntary churn from a non-internet service (e.g., standalone phone, standalone video, or video and phone). That is, the voluntary churn for the non-internet service essentially serves as the baseline control and proxies for the "but-for" trend that would have occurred in voluntary internet churn in the event of no Netflix slowdown. In Table 5a and Table 5b, I look at the correlation between total voluntary internet churn and standalone voluntary internet churn with voluntary churn from non-internet bundles both before the slowdown period and excluding the slowdown period. I use the non-internet bundle with the highest correlation to voluntary internet churn as the baseline bundle. The correlation between voluntary internet churn and standalone voluntary internet churn with standalone voluntary video churn is always {{BEGIN HCI

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10. The results of the regression analysis when the dependent variable was defined to be the difference between voluntary internet churn and voluntary churn from a non-internet service are shown in Table 5c. The table indicates that in Regression Set 1, {{BEGIN HCI

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[6] For example, {{BEGIN HCI

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11. I have also tested whether total internet churn experiences a more significant degree of seasonality than voluntary internet churn. I present the year-on-year total internet churn and voluntary internet churn in Figure 1. If voluntary internet churn experienced a smaller degree of churn (than does total churn) due to seasonality, I would expect it to vary (i) less within a year and also (ii) more across years. {{BEGIN HCI

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12. Lower levels of seasonality for voluntary churn (compared to total churn) can also be demonstrated statistically. In Table 6a, I run Regression Set 1 and Regression Set 2 on both voluntary internet churn and total internet churn.[7] In these regression estimates, the coefficient estimate on the twelve-month lagged churn variable controls for seasonality across years. While this coefficient is {{BEGIN HCI

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13. Finally, the comparative effects of seasonality can be estimated using correlation analysis. Table 6b shows that {{BEGIN HCI

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14. I also ran additional regressions that analyzed the effects of the "throttle" period separately in competitive and non-competitive zip codes. These regressions assess the extent to which the presence of viable broadband alternatives to cable broadband service affects churn levels, particularly when there is deterioration in a subscriber's existing cable broadband service levels. Data on competing broadband providers was provided by TWC in its

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response to Request 80.[8] I defined a "competitive zip code" as a zip code where either AT&T, Verizon, or Google Fiber offered internet services, as these are the only alternatives sufficient to replace cable broadband service.

15. I ran two regressions using the competitive zip code data:

    (i) Regressions using total monthly churn run separately for competitive and non-competitive zip codes. This is comparable to my baseline regressions presented in Table 1;

    (ii) Regressions using zip code level monthly churn run separately for competitive and non-competitive zip codes comparable to the zip code regressions presented in Table 4;

16. As I mentioned earlier (with respect to my explanation of the analysis summarized in Table 4), TWC provided churn data at the zip code level, but Netflix download speed data is available at an average system-wide level. Thus, caution must be exercised when interpreting zip code level regression analyses. With this caveat, I present the regression results for the above two specifications in Tables 7 and 8. The results included in Table 7 (total monthly churn) indicate that **{{BEGIN HCI**

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17. The regression results for the individual zip code level monthly churn data are presented in Table 8. These results are **{{BEGIN HCI**

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[8] **{{BEGIN HCI**

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Tables and Figures Redacted in Entirety