NATIONAL EXCHANGE CARRIER ASSOCIATION, INC.

ACCESS SERVICE
TARIFF F.C.C. No. 5

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VOLUME 1: DESCRIPTION AND JUSTIFICATION

Defines the purpose of the filing, describes the rate structure of the access services and summarizes results.

VOLUME 1-2: TARIFF REVIEW PLAN

VOLUME 2: DEVELOPMENT OF ACCESS ELEMENT REVENUE REQUIREMENTS

Provides a projection of the companies' interstate investments, expenses, revenues and taxes for the past year cost of service study and test year.

VOLUME 3: DEVELOPMENT OF BASELINE DEMAND AND REVENUES

Provides the development of the demand quantities and revenues for the test year at current rates.

VOLUME 4: COMMON LINE RATE DEVELOPMENT

Describes and documents the procedures used to develop Common Line Rates and Federal Universal Service Charges.

VOLUME 5: TRAFFIC SENSITIVE RATE DEVELOPMENT

Describes and documents the procedures to develop recurring and non-recurring rate levels for Switched Access and Special Access services. It also describes the procedures used to develop miscellaneous charges for additional engineering, maintenance and testing of these services, as well as describing the development of Eligible Recovery, ARC rates, and CAF ICC support estimates.

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DEVELOPMENT OF BASELINE DEMAND AND REVENUES

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DEVELOPMENT OF BASELINE DEMAND AND REVENUES

Section 1

INTRODUCTION

A. OVERVIEW

This Volume describes the development of the demand forecasts for the End User, Traffic Sensitive Switched Access and Traffic Sensitive Special Access categories. Section 2 describes the development of End User revenue forecasts by service category based on historical and forecasted access line counts together with service category shares received from Common Line pool participants. Section 3 describes the development of interstate local switching minutes of use (LS MOU) forecasts[1] which are used to pre-populate the interstate MOU in the Connect America Fund Intercarrier Compensation (CAF ICC) data collection[2] NECA conducted in April. It also describes the CAF ICC data collection for fiscal year 2014[3] historical data and 2015/2016 test period projections of intrastate and interstate switched access demand and 2015/2016 test period projections of reciprocal compensation from NECA's Traffic Sensitive pool members.

[1] NECA companies started reporting local switching minutes to the pool in July 2003. Previously, CCL MOUs were the only minute series available for all pool members. LS and CCL MOUs are virtually identical according to Carrier Access Billing System (CABS) data gathered from member companies.

[2] To implement FCC CAF ICC FNPRM order issued in November 2011, NECA designed a web system to collect information needed to develop the rate elements and support amounts in the order. Appendix B 2015 CAF ICC Data Collection details the design and the variables of NECA's web system. See FCC *Connect America Fund*, WC Docket No. 10-90 *et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663 (2011). NECA members have the ability to override NECA's forecasts.

[3] Fiscal year 2014 is a time period from October 1, 2013 to September 30, 2014, as defined in FCC *Connect America Fund*, WC Docket No. 10-90 *et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663 (2011).

Using the collected data, NECA developed each carrier's Access Recovery Charge (ARC) at the exchange/rate zone level and CAF ICC at the study area level. Section 4 describes the methods NECA used to develop aggregated and disaggregated forecasts for Special Access revenues. Special access demand at the rate element level was derived from the aggregate special access forecast using data from NECA's Advanced Services Demand Data Request[4], in which NECA collected demand for major rate elements for Ethernet special access services from its TS pool member companies, and CABS billing data. Using the same datasets, NECA developed the revenue projections for banded and unbanded Special Access services.

B. END USER REVENUE FORECAST METHODOLOGY

NECA used Unobserved Component Models (UCM) [5] to develop access line forecasts for all study areas in the CL pool. NECA's line forecasts were then used to interpolate the forecasts between the months of September 2014, September 2015, and September 2016 which member companies submitted in the annual Forecast Line Count Data Collection in February 2015. Section 3.A describes the details of this methodology.

In its annual Forecast Line Count Data Collection[6], NECA collected both historical and forecasted access line counts by service category from individual exchange carriers.

1. NECA asked its member companies to provide historical data as of September 30, 2014 and forecasts as of September 30, 2015 and September 30, 2016.

[4] Refer to Appendix C 2015 Advanced Services Demand Data Request for details.

[5] See Harvey, A. C. 1989. "Forecasting, Structural Time Series Models and the Kalman Filter", Cambridge: Cambridge University Press.

[6] Refer to Appendix A 2015 Forecast Line Count Data Collection for details.

2. To assist member companies in developing their line count forecasts, NECA provided them with study area specific service category level "guidance forecasts" as a reference before opening its Forecast Line Count Data Collection website in January.

3. NECA used the data collected from member companies to calibrate NECA's study area line count forecasts and develop test period End User revenues.

4. NECA used the calibrated forecasts to pre-populate access line forecasts for the CAF ICC data collection. Member companies had the flexibility to either use NECA's forecasts or override them with their own forecasts for purposes of this filing.

C. SWITCHED ACCESS AND SPECIAL ACCESS DEMAND FORECASTING METHODOLOGY

NECA applied a standardized four-step approach to forecast both Interstate Switched Access and Special Access demand.

1. All data were adjusted to reflect July 1, 2015 tariff participation changes[7] and were trued-up, if necessary, to anticipated final levels using factors calculated from historical pool updates[8].

[7] See Vol. 1, section 1.A and Vol.1, Exhibit 1 for a display of tariff participation changes.

[8] NECA's pooling procedures, which have been in effect since the inception of access charges, permit a period of up to twenty-four months after the data month for the companies to report "trued-up" interstate revenues and demand to the CL and TS Pools.

2. Study areas not affected by acquisitions of exchanges and, in the case of special access, that did not detariff DSL were identified to construct homogeneous data groups used to model and forecast aggregate demand growth.

3. A time-series model of Autoregressive Integrated Moving Average (ARIMA) was selected based on statistical criteria to forecast demand at the aggregate pool level[9].

4. A time-series model of UCM was estimated for each study area to develop each study area's share in the group. It was then used to develop test period company-level forecasts and billing data were used to develop access service rate element forecasts for the pool.

All interstate forecasts were adjusted to include demand levels relating to study areas affected by acquisitions of exchanges. The study area's interstate MOU forecasts were used to pre-populate the interstate MOU section of the CAF ICC data collection system and companies had the ability to modify the projections rather than use NECA's projection in their final data submission.

NECA relied on individual study areas to develop their own intrastate switched MOU and reciprocal compensation forecasts. NECA collected its members' fiscal year 2014 historical data and 2015/2016 test period forecasts of interstate switched minutes, intrastate terminating switched minutes and reciprocal compensation minutes in April as part of NECA's CAF ICC data collection. The details are described in Section 3.B.

[9] See Hamilton, J. D. 1994. "Time Series Analysis", Princeton University Press, Princeton, NJ.

Study areas' interstate special access forecasts were used to develop proposed rates displayed in Volume 5 and, in some cases[10], were used for rate band assignments described in Volume 5.

D. FORECAST RESULTS

Using the methodology described above and data collected as part of the CAF ICC data collection, NECA's test period demand growth forecasts are as follows:

Access Lines Forecast

(Common Line Pool)

Residential CPT Growth (Excluding Lifeline)	Single-Line Business CPT	Multi-Line Business CPT	Total Access Lines Growth
-3.4%	-3.1%	-3.3%	-3.4%

[10] In this filing, NECA assigned member companies to special access rate bands using a combination of historical demand and revenue requirement data, changes in business conditions, historical accuracy of cost forecasts, and projected retention ratios (revenue requirement divided by revenue) and contribution and receipt from the pool.

MOU Forecast

(Traffic Sensitive Pool)

Interstate MOU Growth	Intrastate MOU Growth[11]
-8.0%	-4.3%

DSL Line and Special Access Revenue ($, constant rate) Forecast

(Traffic Sensitive Pool)

DSL Lines Growth	DSL Revenue Growth	Non-DSL Revenue Growth	Special Access Revenue Growth (DSL & Non-DSL)
3.5%	7.1%	-13.6%	-5.6%

[11] For the companies that did not provide their FY 2014 intrastate MOU, the data from the March 2015 settlement view was used in the calculation.

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Section 2

END USER REVENUE FORECASTS BY SERVICE CATEGORY

A. NECA'S STUDY AREA LINE FORECASTS

NECA used a UCM model to develop the forecasts for each study area participating in NECA's Common Line pool that reported common line data since at least January 2013 for the 2015/2016 test period.

Forecasts were developed separately for a consistent set of companies that have participated in NECA's Common Line pool and for companies that have recently joined the Common Line pool. The consistent set of companies includes companies meeting the following four criteria:

1. They were in the NECA Common Line pool throughout the period from January 2003 to December 2014 and reported their lines to NECA.

2. They elected to remain in the Common Line pool for the 2015/2016 test period.

3. They neither bought nor sold exchanges during the period from January 2003 through December 2014.

4. They did not experience any major decline in demand due to the loss of major customers.

For this set of companies (about 98% of the access lines reported to the pool), study area level forecasts were developed using a unique UCM model for every study area[12].

For the companies not in the consistent sample, their forecasts were developed using a UCM model for each study area, accounting for different start periods of NECA pool membership and shifts in access line counts. For each study area monthly forecasted line counts for the period from July 2015 through June 2016 were averaged to arrive at NECA's test period access line forecasts. The test period line count for all Common Line pool members is the sum of study area test period forecasts.

UCM models were estimated for (natural logarithm of) line count series. The basic model was specified, in its most general form, to account for historical patterns, such as seasonality, individual growth rate, and recent trends of line count series of each study area and includes:

- stochastic intercept component
- stochastic slope component
- Stochastic seasonality component[13].

The model is specified as follows:

$$y_t = \mu_t + \gamma_t + \epsilon_t,$$

[12] Model specification and goodness of fit statistics for each study area are available upon request.

[13] See SAS Institute Inc. 2011. "SAS/ETS® 9.22 User's Guide", Cary, NC: SAS Institute Inc.

where μ_t is a locally linear trend component, γ_t is a seasonal component, and ϵ_t is an irregular (or error) component which is assumed to be Gaussian white noise.

Locally linear time trend μ_t is specified as:

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t, \eta_t \sim i.i.d.N\left(0, \sigma_\eta^2\right),$$

and

$$\beta_t = \beta_{t-1} + \xi_t, \quad \xi_t \sim i.i.d.N\left(0, \sigma_\xi^2\right).$$

The term "stochastic" above refers to the case where σ_η^2 and σ_ξ^2 are positive. Observe that when $\sigma_\xi^2 = 0$, μ_t reduces to random walk with deterministic drift, and when $\sigma_\xi^2 = \sigma_\eta^2 = 0$, μ_t is just a linear time trend.

Seasonal component of length $s = 12$ months is characterized by the system of equations:

$$\sum_{i=0}^{s-1} \gamma_{t-i} = \omega_t \ , \quad \omega_t \sim i.i.d.N(0, \sigma_\omega^2).$$

Similar to the definitions above, when $\sigma_\omega^2 = 0$ the seasonal component is deterministic and can be thought of as a collection of $s - 1$ dummy variables corresponding to months of the year except one. When $\sigma_\omega^2 > 0$ the seasonal component is stochastic and evolves over time.

To estimate the line count model for each study area, the general model was refined to either restrict a specific component to be deterministic, or to drop it from specification for that particular study area on the basis of a significance test with ex-post verification by Akaike Information Criterion.

After the models have been estimated at the study area level, the forecasts generated by the models were checked for reasonableness. In particular, the forecasted growth rate of line counts for the study area was compared with the historical growth rate for that study area and with the pool average forecasted growth rate. In cases of substantial difference between the forecasted growth rate and the historical and/or pool average growth rate, the forecast was individually re-examined and, if necessary, re-estimated.

For the Common Line pool member study areas that have not been in the pool long enough to estimate their demand based on a robust model, the forecast for the test period was made on the basis of fitting a log-linear trend between company-provided forecasts for September 30, 2014, September 30, 2015 and September 30, 2016. For the rest of the study areas a model forecast was used to populate monthly values between January 2015 and September 2016 after rescaling it to exactly match September forecasts provided by the member companies.

After combining forecasts for the consistent set of companies with the companies not in the consistent sample, the projected NECA Common Line pool total access lines annualized growth rate from year 2014 to the 2015/2016 test period is –3.4%.

B. <u>END USER REVENUE FORECASTS BY SERVICE CATEGORY</u>

NECA works cooperatively with member companies to develop service category access line forecasts. These forecasts serve as the basis for developing NECA's End User revenue projections. NECA Common Line participant study areas provided NECA with line count history and forecasts by the following service categories: Residence Customer Premises Terminations (CPTs), Lifeline Assistance CPTs, Single-Line Business CPTs, Multi-Line Business CPTs, Residential Centrex CPTs, Business Centrex CPTs, Basic Rate Interface ISDN arrangements, Primary Rate Interface ISDN arrangements, DS1 Channel Service arrangements, total payphone stations, payphone stations subject to FUSC, Special Access Surcharge channels and Unbundled Network Element (UNE) lines.

To generate the service level forecasts and End User revenue forecasts by service category, NECA followed the steps below:

1. Calculated September 30, 2014, September 30, 2015 and September 30, 2016 service category shares of total study area access line counts based on data collected from NECA Common Line pool participants in February 2015.
2. Linearly interpolated access line shares by service category for intermediate months.
3. Applied monthly service shares to monthly study area total access line forecasts to obtain monthly service category line count forecast by study area.
4. Calculated service category End User revenue by applying end user rates to each study area's average monthly access line counts by service category for the 2015/2016 test period.

The pool level access line counts by service category are shown in Volume 3, Exhibit 1, Workpaper 1 of 1.

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Section 3

INTERSTATE, INTRASTATE LOCAL SWITCHING

AND RECIPROCAL COMPENSATION DEMAND FORECASTS

A. INTERSTATE LOCAL SWITCHING MINUTES OF USE DEMAND FORECAST

1. Interstate Local Switching Minutes Aggregate Level Forecast

NECA developed its interstate MOU guidance forecasts for TS pool participants using a time series technique known as an Autoregressive Integrated Moving Average (ARIMA) [14]. This forecasting technique predicts a value in a response time series as a linear combination of its own past values and past errors (also called shocks or innovations), using the natural log of interstate LS MOU as inputs.

NECA developed the aggregated MOU of a consistent sample of companies meeting four criteria:

(1) They were in the NECA pool throughout the period from January 2003 through December 2014 and reported their interstate LS MOU to NECA.

(2) They elected to remain in the TS pool during the 2015/2016 Test Period.

[14] For a description of ARIMA, see Hamilton, J. D. 1994. “Time Series Analysis, Chapter 15: Models of Nonstationary Time Series”, Princeton University Press, Princeton, NJ.

(3) They neither bought nor sold exchanges during the period from January 2003 through December 2014.

(4) They did not experience any major decline in demand due to the loss of major customers.

The specific ARIMA model fitting this set of companies' historical MOU data best was selected as NECA's aggregate MOU forecasting model. The forecast model was specified as follows:

The log of interstate LS MOU was differenced by taking twelve month differences to remove seasonal effects and produce a stationary series.

Independent variables include:

- Lags of the dependent variable (AR variables)
- Lags of the error term (MA variables)

In addition, the ARIMA model includes the "outlier" variable to capture the effect of the occurrence of special events on the response series. Following is the Interstate LS MOU model estimation:

Variable	Coeff.	Std. Error	T-Stat.
MA1,1	1.2652	0.2248	5.63
MA1,2	-0.6621	0.2274	-2.91
AR1,1	2.0867	0.2230	9.36
AR1,2	-1.6253	0.4013	-4.05
AR1,3	0.7008	0.2878	2.43
AR1,4	-0.5341	0.2431	-2.2
AR1,5	0.6598	0.2014	3.28
AR1,6	-0.2885	0.0881	-3.27
Out_201312	0.0342	0.0126	2.72

R^2 0.9983 Durbin-Watson 1.98

Observations 132 Degrees of Freedom 122

Estimation Interval 200301 – 201412

These diagnostics indicate the model captures the underlying demand behavior well. The t-statistics are all highly significant. The Durbin-Watson test indicated the absence of serial correlation in the residual series. The projected growth in demand from fiscal year 2014 to the 2015/2016 test period results in an annual decline in total minutes of 9.4%.

2. Study Area Level Interstate MOU Forecast

To develop study area level MOU forecasts, a five-step procedure was used.

(1) Aggregated MOU monthly historical and forecasted levels for the consistent sample served as the baseline for developing study area specific forecasts.

(2) For each study area in the consistent sample, a preliminary forecast was generated by applying a UCM method[15] and the associated monthly shares were derived based on the ratio of the monthly projection relative to the total projection. By applying the monthly shares to the aggregate MOU monthly forecasts obtained from step (1), the study area level monthly forecasts were produced.

(3) For each study area not in the consistent sample, because there are not enough observations to develop statistical models, the UCM method was not used. Forecasts for these study areas were computed using the average proportion of their minutes to the aggregate minutes of the consistent sample for the period October through December 2014 for Non-Alaskan companies and from January through December 2014 for Alaskan companies[16].

(4) Projected minutes for the consistent sample companies and those not part of the consistent sample were combined to produce the study area interstate MOU forecasts for the total NECA pool.

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[15] See Volume 3 Section 2.A for a detailed description of UCM method.

[16] In order to catch a 12-month seasonality cycle exhibited in Alaskan companies, January through December 2014 is used as a base period to generate the forecasts for this group of companies.

(5) The study area interstate MOU forecasts were used to pre-populate the interstate MOU field of the CAF ICC data collection system. Companies had the flexibility to override it with their own forecasted minutes.

About 50% of member companies used NECA's projection of interstate minutes and the rest of them replaced NECA's projections with their own. The test period annualized growth rate for the total pool is -8.0 based on combined NECA and company projections.

B. INTRASTATE SWITCHED ACCESS AND RECIPROCAL COMPENSATION DEMAND FORECAST

In order to develop Access Recovery Charge (ARC) and Connect American Fund Intercarrier Compensation (CAF ICC) support, NECA developed a web application to collect its TS pool members' test period forecasts of intrastate MOU, access lines by three major service categories(residential, single-line business, & multi-line business), and reciprocal compensation minutes.

NECA also collected fiscal year 2014 intrastate and interstate minutes to calculate test period annualized growth rates. In addition to demand quantities, the web system also collected local charges by exchange / rate zone, state support amounts, intrastate switched access terminating revenue and net reciprocal compensation revenue which were used to calculate the test period revenue requirement and revenue[17]. The pool level projections of interstate switched

[17] See Volume 5 Section 4.B for a detailed description of development of ARC and CAF ICC.

MOU, intrastate switched MOU, and reciprocal compensation MOU for NECA's Traffic Sensitive pool members are summarized in Volume 3, Exhibit 2, Workpaper 1 of 1.

Appendix B details the CAF ICC data collection system, process, and data field definitions.

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Section 4

INTERSTATE SPECIAL ACCESS DEMAND FORECASTS

A. INTERSTATE SPECIAL ACCESS AGGREGATE LEVEL FORECASTS

NECA's aggregate forecasts include two categories: special access revenue forecasts and DSL line forecasts. The revenue forecasts are the sum of forecasts for five sets of study areas:

(1) Study areas that have been in the pool since July 2006 and subscribe to NECA's special access tariff in its entirety (named SP consistent sample)

(2) Study areas subscribing to NECA's tariff in its entirety but excluded from the consistent sample because they were either not in the TS pool for the entire period or bought (or sold) exchanges since July 2006

(3) Study areas that will file their own DSL tariffs for the 2015/2016 test period but were in the TS pool for the entire historical period since July 2006 (named DSL_EXIT consistent sample)

(4) Study areas that will file their own DSL tariffs for the 2015/2016 test period and were not in the TS pool for the entire historical period since July 2006

(5) Study areas entering NECA's TS pool or DSL tariff on July 1, 2015.

The special access revenue forecasts are separated according to service type, i.e. DSL and Non-DSL revenue. DSL revenue and DSL line forecasts include forecasts for all study areas belonging to study area sets (1) and (2) and (5), if entering DSL tariff, as described above. Non-

DSL revenue forecasts include forecasts for all study areas belonging to any of the five study area sets.

1. Special Access Revenue Aggregate Forecast

NECA used the ARIMA time series technique[18] to develop test period special access constant rate (unbanded) revenue forecasts by Non-DSL and DSL service categories. The constant rate revenue excluded the historical banding and rate change impacts on the billed revenue, so that the data series are indexed on a uniform basis. The practice is to separate the individual study area's billed revenue from the pricing (or banding) factors which represent the premium/discount ratio associated with companies' specific band and the tariff rate index which represents the rate change history. Given the different growth patterns in the historical DSL revenue and Non-DSL revenue data series, they are projected separately. The aggregate forecast model was specified as follows:

> The log of interstate DSL or Non-DSL constant rate revenue was differenced using adjacent months to produce a stationary series. Dummies were tested for the rate-change months and the adjacent months. The dummy variables are designed to eliminate the residual rate-change effect on the historical special access constant rate revenue series not captured by the constant rate conversion process. Besides dummy variables, the independent variables include:

- Lags of the dependent variable (AR variables)
- Lags of the error term (MA variables)

[18] See the discussion relating to forecasting interstate LS MOU in Section 3.A

The results of NECA's special access constant rate revenue aggregate models for DSL service are shown below:

DSL constant rate revenue ARIMA model estimation:

Variable	Coeff.	Std. Error	T-Stat.
MA1,1	0.2480	0.1070	2.32
MA1,2	-0.5858	0.0668	-8.77
MA1,3	0.7079	0.0938	7.55
AR1,1	0.3740	0.0966	3.87
AR1,2	-0.2735	0.1004	-2.72
AR1,3	0.8471	0.0895	9.47
out_201307	-0.0327	0.0077	-4.22

R^2 0.9985 Durbin-Watson 2.16

Observations 101 Degrees of Freedom 103

Estimation Interval 200607 – 201412

The model produced a total consistent sample test period annualized special access DSL constant rate revenue[19] growth rate of 7.1 %.

For the DSL_EXIT consistent sample group, their DSL revenue was excluded from their special access revenue history for developing forecasts, hence their special access revenue forecasts are the same as their Non-DSL revenue forecasts since their DSL shares are zero. NECA has monthly pooling data from these companies beginning in July 2006. Given the convergence in the historical data pattern, the Non-DSL revenue from the special access

[19] All revenue are at current unbanded rates or adjusted for banding and rate change impacts

consistent sample and DSL_EXIT consistent sample are combined into one data series for model estimation and revenue projection purposes. The table below shows the results of NECA's special access Non-DSL constant rate revenue aggregate model.

Non-DSL constant rate revenue ARIMA model estimation:

Variable	Coeff.	Std. Error	T-Stat.
MU	0.0061	0.0018	3.45
MA1,1	-0.1916	0.1058	-1.81
MA1,2	-0.3048	0.1108	-2.75
AR1,1	-0.2389	0.1018	-2.35
out_201407	-0.0152	0.0055	-2.79

R^2 0.9949 Durbin-Watson 1.73

Observations 101 Degrees of Freedom 95

Estimation Interval 200607 – 201412

The statistics for both models indicate the models fit historical data well. The Durbin-Watson test indicated the absence of serial correlation in the residual series.

The model produced a total consistent sample test period annualized special access Non-DSL constant rate revenue growth rate of -13.5 %.

For study areas not in the consistent sample groups, NECA produced forecasts based on the historical proportions to aggregate revenue of the consistent sample for the DSL and Non-DSL categories respectively. For study areas reentering NECA's TS pool, NECA used one of the following two approaches to estimate their special access constant rate revenue:

(1) Developed forecasts using special access constant rate (unbanded) revenue per access line derived from the consistent sample for 2014 and the 2015/2016 test period. These per-line factors were multiplied by the reentering companies' access lines to derive their 2014 constant rate (unbanded) revenue estimates and projections for the 2015/2016 test period.

(2) Estimated current special access constant rate (unbanded) revenue based on the relationships of major special access rate elements between NECA's and the company's current rates and demand information provided by the company.

The sum of these projections produced an aggregate annual growth rate of -5.6% for NECA's total pool special access constant rate (unbanded) revenue.

2. Special Access DSL Lines Aggregate Forecast

For study areas belonging to the special access consistent sample, NECA used their monthly aggregate DSL lines data series starting from July 2006 to estimate a UCM model and develop their DSL line forecasts for the 2015/2016 test period. The model significance analysis results are shown below:

DSL LINE UCM Model Estimation:

Variable	DF	Chi-Square	Pr > ChiSq
Level	1	$7.84x10^7$	<.0001
Slope	1	1.75	0.1863
Season	11	49.97	<.0001
Dummy_201003	1	11.71	0.0006
Dummy_200811	1	10.36	0.0013

The statistics of the model indicate the model fits historical data well, with the average deviation between forecasts and out of sample actual data as small as 0.7%. The model produced a 3.5% test period annualized growth rate for DSL lines for this group of study areas.

The higher DSL revenue growth rate of 7.1%, compared to the DSL line growth rate of 3.5%, is attributable to customers' migration to higher speed DSL services resulting in higher average revenue per DSL line.

B. INTERSTATE SPECIAL ACCESS STUDY AREA LEVEL FORECASTS

NECA applied the same procedure used for study area interstate local switching minutes demand forecasts to develop individual study area special access DSL and Non-DSL constant rate (unbanded) revenue forecasts and DSL lines forecasts. For each study area in the special access consistent sample as well as the DSL_EXIT consistent sample, a test period monthly share was developed based on its monthly share of total special access revenue obtained from the UCM method relative to the corresponding pool aggregate revenue. By applying the series of monthly share to the aggregate forecasts from section A, the study area special access DSL and Non-DSL constant rate revenue forecasts and DSL line forecasts were derived. The UCM estimation results for individual study areas are available upon request.

For all other study areas not in the special access consistent sample or the DSL_EXIT consistent sample, because there are not enough observations to develop statistical models, their forecasts were computed using the average proportion of their revenue to the corresponding aggregate revenue for the consistent sample for the period October 2014 through December 2014 for Non-Alaskan companies and from January 2014 through December 2014 for Alaskan companies.

To further refine the alignment of rates with costs, starting with the 2013 annual tariff filing, NECA has assigned separate rate bands for DSL Voice-Data service and DSL Data-Only service. To support the separate banding structure, NECA requested member companies to report Data-Only and Voice-Data DSL lines and revenue to the settlement system starting January 2013.

Given the limited history of data series, NECA still projected DSL demand in total by summing up the two service categories. The projections on DSL revenue and lines have been discussed in the sections above. Once obtaining DSL demand projections for each study area, NECA split them into Data-Only and Voice-Data DSL based on individual study areas' average ratio of each service category relative to its total DSL demand from October through December 2014 except companies whose Data-Only revenue have dropped to zero after January 2015. For companies having zero Data-Only DSL revenue after January 2015, their total DSL demand forecasts were assigned to Voice-Data DSL service.

C. SPECIAL ACCESS REVENUES AND DEMAND AT RATE ELEMENT LEVEL

NECA maintains rate element level detail in its Tariff Element Tracking (TET) System, a database containing CABS information. TET consists of 109 study areas in NECA's TS pool that billed Special Access revenues in 2014. This group of companies represents approximately 3.9% of the Special Access revenues reported by TS pool companies in NECA's settlements system.

NECA gathered additional data from the Advanced Services Demand Data Request to develop rate element level demand forecasts for advanced services (DSL, DSL Connection

Points, ATM, Frame Relay, SONET, ETS, and IP Gateway Access Service), because these services are not well represented in the TET data. NECA priced out demand collected in the Advanced Services Demand Data Request to estimate advanced services revenue, then subtracted this revenue from the aggregate Special Access revenue estimate to derive revenue associated with the traditional special access services represented in TET (Voice Grade, High Capacity DS1 and DS3, etc.). To develop the forecasts for traditional Special Access services at the rate element level, NECA used the following process:

1. Priced demand in TET at June, 30, 2015 uniform (unbanded) rates to estimate 2014 revenue at constant rates. [20]
2. Computed the share of TET revenue for each TET element.
3. Expanded each element's revenue to the traffic sensitive pool level by applying the resulting revenue shares to estimated 2014 Special Access revenue net of advanced services, which includes DSL, DSL Connection Points, ATM, Frame Relay, SONET, IPG Access Service, and ETS revenue at the current uniform rates.
4. Derived rate element demand at the pool level by dividing each element's estimated 2014 revenue by its corresponding June 30, 2015 uniform rates.
5. Estimated demand for the 2015/2016 test period, by applying a growth rate to each element's 2014 demand. The growth rates used were derived based on comparisons of the demand for eight broad categories of traditional Special

[20] Effective January 1, 2008, NECA expanded the scope of rate banding to apply to all special access recurring rate elements (except Digital Subscriber Line) and all switched access dedicated transport recurring rate elements. *See* National Exchange Carrier Association, Inc., Tariff F.C.C. No. 5, Transmittal No. 1192, filed December 17, 2007.

Access services recorded in TET in the second half of 2014 relative to the first half of 2014.

6. Multiplied the estimated 2015/2016 test period rate element demand levels by the current uniform rate to arrive at test period revenues at current rates, which were then scaled to correspond to the Special Access test period revenue forecast for traditional services.

7. Divided these revenues by the current uniform rate to arrive at rate element demand at the pool level for the test period. The demand trends for the major components of Special Access services are displayed in Volume 3, Exhibit 3, Workpapers 1 and 2.