**2017 Urban Rate Survey – Rates for Fixed Voice Service**

**Introduction**

Every year, the Wireline Competition Bureau (Bureau) surveys the rates for standalone telephone service charged by a representative sample of fixed voice providers to “establish a rate floor that eligible telecommunications carriers (ETCs) receiving high-cost loop support (HCLS) or frozen high-cost support must meet to receive their full support amounts and to help ensure that universal service support recipients offering fixed voice and broadband services do so at reasonably comparable rates to those in urban areas.” [[1]](#footnote-1) This document shows how the rate floor and the reasonable comparability benchmark for fixed voice service were calculated based on the 2017 Urban Rate Survey.

The 2017 Urban Rate Survey (URS) received 396 responses with monthly rates from 57 different providers offering fixed voice service in 394 different census tracts. The Bureau used responses from incumbent local exchange carriers (ILECs) (149 responses from 23 ILECs in 149 census tracts) to determine the rate floor for fixed voice service, consistent with the methodology previously adopted by the Bureau.[[2]](#footnote-2) This analysis estimated an urban average monthly rate of $22.49, with a 95% confidence interval of ($21.81, $23.19) for Unlimited or Flat-Rate Local Service. To determine the reasonable comparability benchmark for voice service, the Bureau used all responses (both ILEC and non-ILEC), consistent with the methodology previously adopted by the Bureau.[[3]](#footnote-3) The reasonable comparability benchmark is $49.51, two standard deviations above the urban average (including subscriber line charges (SLCs)) for all local flat-rate providers.

We continue to improve the URS sampling and estimation methodology used to produce national representative estimates. The 2017 URS had three minor changes from the 2016 survey. First, the 2017 survey allocated sample size in each stratum proportional to that of the total offers, instead of equal sample size in each stratum. Second, the 2017 survey modified the Provider Presence Ratio model to include state variations in estimating number of households offered service by the service provider in the census tract based on number of subscribers. Third, the 2017 survey incorporated sampling probability in constructing final weights.

**Sample Design and Selection**

As with past surveys, the sampling unit for the 2017 fixed voice survey is a (service provider, census tract) pair. The frame (source data from which we selected our sample) for the survey is the set of sampling units encompassing providers offering fixed voice service to residential customers in urban census tracts. The frame consists of 213,809 sampling units from 793 service providers and 58,149 census tracts. The data used to construct the frame come from the June 2015 Form 477 and ILEC study area boundary data collections.

The frame was divided into two strata:

* ILEC – Sampling units in which the service provider was identified as an ILEC in the urban census tract. This stratum consisted of 64,619 sampling units encompassing 426 service providers and 58,051 urban census tracts.[[4]](#footnote-4)
* Non-ILEC – Sampling units in which the service provider was identified as a Non-ILEC in the urban census tract. This stratum consisted of 149,190 sampling units encompassing 395 service providers and 55,653 urban census tracts.

For each sampling unit, the number of offers[[5]](#footnote-5) was calculated as:

*Offers = Provider Presence Ratio x (Number of households in the sampling unit’s census tract)*

The Provider Presence Ratio for an ILEC sampling unit was calculated as the ILEC’s fraction of residential subscribers in the census tract relative to the total number of residential subscribers for all ILECs in the census tract. Thus, we assumed that the ILEC offered service within the entire tract if no other ILEC reported residential subscribers in the census tract.

The Provider Presence Ratio for a Non-ILEC sampling unit is more complicated because Non-ILEC providers are generally able to define their own service areas. We therefore needed a proxy for the portion of households in the census tract that a Non-ILEC provider covers (i.e., the Provider Presence Ratio). To do this, we used a regression model to estimate the proportion of the census tract’s households to which a Non-ILEC provider offers voice service. Similar to the 2016 survey, the regression model for the 2017 survey was also developed based on FCC Form 477 data relating broadband provider presence to broadband provider subscription.[[6]](#footnote-6) The regression model for the 2017 survey was slightly modified to incorporate state variations. The resulting equation was then used to create a Provider Presence Ratio equation. A Provider Presence Ratio was calculated for each Non-ILEC sampling unit using the following formula:

Provider Presence Ratio = $\frac{1}{1+10^{-Y}}$

where

Y = b0 + b1 \* Log10 ($\frac{X}{1-X}$) + rn \* staten

X = residential subscribers for provider in the tract / households in the tract

State = indicators of which state the residential subscribers are in.

The b0, b1, and rn are model coefficients. The model coefficients are included in the Appendix.

A sample of 156 and a sample of 344 sampling units were selected randomly with unequal selection probability as a function of number of offers from a provider in a given tract, from the ILEC and non-ILEC stratum respectively. The sample size in each stratum was allocated proportionally to that of the total offers. The selection was performed using the “strata” procedure in the R sampling package weighted proportionately by the units’ number of offers described earlier.

The following table summarizes the survey frame and the sample drawn from it:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | Stratum | Units | Providers | Census Tracts | Offers |
| Frame | Overall | 213,809 | 793 | 58,149 | 306,184,285 |
|   | ILEC | 64,619 | 426 | 58,051 | 95,601,833 |
|   | Non-ILEC | 149,190 | 395 | 55,653 | 210,582,452 |
| Sample | Overall | 500 | 79 | 497 | 907,183 |
|   | ILEC | 156 | 26 | 156 | 300,527 |
|   | Non-ILEC | 344 | 54 | 344 | 606,657 |

**Survey Response**

The table below shows the number of responses, the number of different service providers, and the number of different census tracts within each stratum for survey responses requested, received, and received indicating service was provided.[[7]](#footnote-7)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Stratum | Survey Status | Responses | Service Providers | Census Tracts |
| ILEC | Requested | 156 | 26 | 156 |
| Received | 149 | 23 | 149 |
| Service Provided | 149 | 23 | 149 |
| Non-ILEC | Requested | 344 | 54 | 344 |
| Received | 293 | 44 | 293 |
| Service Provided | 247 | 34 | 247 |
| All | Requested | 500 | 79 | 497 |
| Received | 442 | 63 | 439 |
| Service Provided | 396 | 57 | 394 |

Each response stating that service was provided indicated whether each of the following service types was offered:

* Unlimited or Flat-Rate Local Service
* Unlimited All-Distance Service
* Measured or Messaged Local Voice Service

The table below provides the number of responses with rates for each service type in each stratum.

|  |  |  |
| --- | --- | --- |
| Service Type | ILEC Stratum Rates | Non-ILEC Stratum Rates |
| Unlimited or Flat-Rate Local Service | 148 | 176 |
| Unlimited All-Distance Service | 133 | 214 |
| Measured or Messaged Local Voice Service | 130 | 53 |

**Monthly Rates and Rate Spreads**

The rate spread (the maximum rate less the minimum rate) is an additional component of the calculation of the standard deviation of monthly rates. For each (service provider, census tract) pair, separate monthly rates were calculated for each of the two service technologies (circuit and interconnected VoIP (iVoIP)). The following average monthly rates were calculated:

* Average RSC[[8]](#footnote-8) = (Minimum RSC + Maximum RSC)/2
* Average StSLC[[9]](#footnote-9) = (Minimum StSLC + Maximum StSLC)/2
* Average StUSF[[10]](#footnote-10) = (Minimum StUSF + Maximum StUSF)/2
* Average ManEAS[[11]](#footnote-11) = (Minimum ManEAS + Maximum ManEAS)/2
* Average FSLC[[12]](#footnote-12) = (Minimum FSLC + Maximum FSLC)/2

If the service provider indicated that multiple rates were not offered in the census tract, then the average monthly rates above were set equal to the minimum[[13]](#footnote-13) monthly rate provided in the response.

The analysis focused on two rates, one for determining the rate floor and one for determining the reasonable comparability benchmark. For the rate floor, the following average monthly rate was used if the service provider offered multiple rates in the census tract:

* Minimum Rate = Minimum RSC + Minimum StSLC + Minimum StUSF + Minimum ManEAS
* Maximum Rate = Maximum RSC + Maximum StSLC + Maximum StUSF + Maximum ManEAS
* Average Rate = (Minimum Rate + Maximum Rate)/2
* Rate Spread = Maximum Rate - Minimum Rate

The following average monthly rate was used if the service provider did not offer multiple rates in the census tract:

* Average Rate = Minimum RSC + Minimum StSLC + Minimum StUSF + Minimum ManEAS
* Rate Spread = 0

For the reasonable comparability benchmark (CB), the following average monthly rate was used if the service provider offered multiple rates in the census tract:

* Minimum Rate CB = Minimum Rate + Minimum FSLC
* Maximum Rate CB = Maximum Rate + Maximum FSLC
* Average Rate CB = (Minimum Rate CB + Maximum Rate CB)/2
* Rate Spread CB = Maximum Rate CB - Minimum Rate CB

The following average monthly rate was used if the service provider did not offer multiple rates in the census tract:

* Average Rate CB = Minimum Rate + Minimum FSLC
* Rate Spread CB = 0

**Weights**

Weights are required to ensure the contributions of each response properly represent the offers that consumers possibly receive nationwide. Weights are also used to insure that a service provider‘s rates do not exert extra influence on the estimate only because it offers service using two technologies instead of one.

The 2017 survey weight construction differed from 2016 survey to accommodate changes in the sample design and the sample selections. Each rate was assigned a weight:

*Weight = Sampling Weight x Nonresponse Weight x Rate Weight x Offer*

*Sampling Weight* is the inverse of the selection probability for each sample unit. The selection probability is determined by the total number of units in each strata, the sample size in each strata, and the units’ number of offers described in the sample selection section earlier. Each sample is assigned a sampling weight to reflect its selection probability.

*Nonresponse Weight* is assigned to each stratum in order to compensate for unit nonresponse in each stratum. It is the total number of offers sampled over the total number of offers in the sampled census tracts of a given provider who has provided rate responses in each stratum.

*Rate Weight* is assigned to average the rates for iVoIP and circuit when both are employed by the service provider in a census tract for that service. A service provider that offers a service via iVoIP and circuit technologies is given a weight of ½ for its rates for each service. Otherwise, the rates have a weight of 1.

The final weight is the product of Sampling Weight, Nonresponse Weight, Rate Weight, and the number of offers from a provider in a given tract.

**Rate Estimates for Unlimited or Flat-Rate Local Service**

The average rate is estimated as the following:

Estimated average rate = $\frac{\sum\_{i=1}^{N}w\_{i}Rate\_{i}}{\sum\_{i=1}^{N}w\_{i}}$ , N = total number of rate responses

Estimates of the average rate and the standard deviation of rates were calculated separately for each stratum and for the strata combined. The estimated average rate was the weighted average of rates for the stratum or combined strata. The estimated standard deviation of rates is calculated as the following:

Estimated standard deviation = $\sqrt{\frac{\sum\_{i=1}^{N}w\_{i}(Rate\_{i}-Estimated average rate)^{2}}{\sum\_{i=1}^{N}w\_{i}-1}}$

The table below presents the rate estimates for each stratum separately and combined.

|  |  |  |
| --- | --- | --- |
| Service Providers | Without FSLC | With FSLC |
| Average | Standard Deviation | Average | Standard Deviation |
| ILEC | $ 22.4982 |  $ 4.4202 | $ 28.3150 |  $ 4.4286 |
| Non-ILEC | $28.1036 | $10.67268 | $32.7080 | $11.09787 |
| All | $ 25.8580 | $ 9.1366 | $ 30.9480 |  $ 9.2803 |

**Rate Floor**

As determined by the Commission in the *USF/ICC Transformation Order*,[[14]](#footnote-14) the rate floor is based on the average monthly rate (excluding FSLC) for Unlimited or Flat-Rate Local Service. For 2017, the rate floor is $22.49, with a 95% confidence interval of ($21.81, $23.19).

The confidence interval was calculated by finding the weighted average monthly rate (excluding FSLC) for Unlimited or Flat-Rate Local Service offered by ILECs in each of the 148 census tracts in the ILEC stratum. The standard deviation of the average rate is the standard deviation of these census tract average rates divided by the square root of 148. The 95% confidence interval for the average rate was calculated as the average rate plus or minus the standard deviation of the average times the 0.975 quantile of Student’s *t* distribution with degrees of freedom equal to 147.

**Reasonable Comparability Benchmark**

The reasonable comparability benchmark was calculated by taking two standard deviations above the average urban rate for all local flat-rate providers, with SLCs included in the rates.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service Type | Responses with Rates | Service Providers | Census Tracts | Average Rate | Two Std Devs above the Average Rate |
| Unlimited or Flat-Rate Local Service | 343 | 52 | 322 | $30.9480 | $49.5090 |

 The reasonable comparability benchmark for voice service is based on the average monthly rate plus two standard deviations (including FSLC) for Unlimited or Flat-Rate Local Service offered by ILECs and non-ILECs. [[15]](#footnote-15) This value is $49.51.

**APPENDIX A**

**Provider Presence Ratio Model Coefficients**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   |   | Estimate | Std. Error |   |
| b0 | (Intercept) | 2.6056 | 0.0338 | \*\*\* |
| b1 | Log10 ($\frac{X}{1-X}$) | 0.7091 | 0.0032 | \*\*\* |
| r1 | State Fips 02 | 0.6670 | 0.1075 | \*\*\* |
| r2 | State Fips 04 | -0.3734 | 0.0428 | \*\*\* |
| r3 | State Fips 05 | 0.0980 | 0.0576 | . |
| r4 | State Fips 06 | -0.0880 | 0.0356 | \* |
| r5 | State Fips 08 | -0.2195 | 0.0454 | \*\*\* |
| r6 | State Fips 09 | 0.6514 | 0.0505 | \*\*\* |
| r7 | State Fips 10 | 0.4732 | 0.0721 | \*\*\* |
| r8 | State Fips 11 | 0.6299 | 0.0779 | \*\*\* |
| r9 | State Fips 12 | -0.5730 | 0.0374 | \*\*\* |
| r10 | State Fips 13 | 0.1832 | 0.0413 | \*\*\* |
| r11 | State Fips 15 | 0.3466 | 0.0833 | \*\*\* |
| r12 | State Fips 16 | -0.1304 | 0.0733 | . |
| r13 | State Fips 17 | 0.0941 | 0.0385 | \* |
| r14 | State Fips 18 | 0.0493 | 0.0434 |   |
| r15 | State Fips 19 | -0.3299 | 0.0542 | \*\*\* |
| r16 | State Fips 20 | 0.2518 | 0.0548 | \*\*\* |
| r17 | State Fips 21 | 0.6406 | 0.0521 | \*\*\* |
| r18 | State Fips 22 | 0.2034 | 0.0459 | \*\*\* |
| r19 | State Fips 23 | -0.5485 | 0.0750 | \*\*\* |
| r20 | State Fips 24 | 0.2220 | 0.0429 | \*\*\* |
| r21 | State Fips 25 | 0.4524 | 0.0436 | \*\*\* |
| r22 | State Fips 26 | -0.1164 | 0.0400 | \*\* |
| r23 | State Fips 27 | -0.1127 | 0.0482 | \* |
| r24 | State Fips 28 | 0.1736 | 0.0664 | \*\* |
| r25 | State Fips 29 | -0.0952 | 0.0463 | \* |
| r26 | State Fips 30 | 0.0597 | 0.0938 |   |
| r27 | State Fips 31 | 0.0002 | 0.0658 |   |
| r28 | State Fips 32 | -0.1436 | 0.0537 | \*\* |
| r29 | State Fips 33 | 0.0790 | 0.0840 |   |
| r30 | State Fips 34 | 0.4344 | 0.0416 | \*\*\* |
| r31 | State Fips 35 | -0.0321 | 0.0609 |   |
| r32 | State Fips 36 | 0.7833 | 0.0378 | \*\*\* |
| r33 | State Fips 37 | 0.4690 | 0.0415 | \*\*\* |
| r34 | State Fips 38 | -0.4277 | 0.1093 | \*\*\* |
| r35 | State Fips 39 | 0.0977 | 0.0398 | \* |
| r36 | State Fips 40 | -0.5419 | 0.0515 | \*\*\* |
| r37 | State Fips 41 | -0.5279 | 0.0504 | \*\*\* |
| r38 | State Fips 42 | -0.3204 | 0.0390 | \*\*\* |
| r39 | State Fips 44 | 0.8474 | 0.0789 | \*\*\* |
| r40 | State Fips 45 | 0.2824 | 0.0465 | \*\*\* |
| r41 | State Fips 46 | -0.1934 | 0.1009 | . |
| r42 | State Fips 47 | 0.2512 | 0.0442 | \*\*\* |
| r43 | State Fips 48 | -0.2016 | 0.0367 | \*\*\* |
| r44 | State Fips 49 | 0.0793 | 0.0507 |   |
| r45 | State Fips 50 | 0.4312 | 0.1406 | \*\* |
| r46 | State Fips 51 | 0.1599 | 0.0421 | \*\*\* |
| r47 | State Fips 53 | -0.2647 | 0.0441 | \*\*\* |
| r48 | State Fips 54 | -0.3751 | 0.0638 | \*\*\* |
| r49 | State Fips 55 | 0.6188 | 0.0448 | \*\*\* |
| r50 | State Fips 56 | 0.3756 | 0.1325 | \*\* |
| r51 | State Fips 72 | 0.8839 | 0.0564 | \*\*\* |

Significance codes: \*\*\* 0.001, \*\* 0.01, \* 0.05, . 0.1

1. *Connect America Fund*, WC Docket No. 10-90, Order, 28 FCC Rcd 4242 (WCB/WTB 2013). [↑](#footnote-ref-1)
2. *See* 2014 Urban Rate Survey Methodology (<https://apps.fcc.gov/edocs_public/attachmatch/DA-14-520A3.pdf>) at 2. [↑](#footnote-ref-2)
3. *See* *id*. [↑](#footnote-ref-3)
4. Forty-five census tracts had no residential households. These census tracts were not included in the frame. [↑](#footnote-ref-4)
5. The number of “offers” is the estimated number of potential customers to which the providers advertise their service. [↑](#footnote-ref-5)
6. Linear regression was used to regress Log10 ($\frac{p}{1-p}$) on Log10 ($\frac{s}{1-s}$) where p is the fraction of housing units covered by the broadband provider in the census tract and s is the provider’s broadband subscriber fraction of households in the tract. This assumes that the relationship of voice provider presence to voice subscribership is similar to that of broadband provider presence to broadband subscribership. [↑](#footnote-ref-6)
7. Responses that indicated service provided but later found to be business only or bundled only are excluded from this count. [↑](#footnote-ref-7)
8. Recurring Service Charge is abbreviated as RSC. [↑](#footnote-ref-8)
9. State Subscriber Line Charge is abbreviated as StSLC. [↑](#footnote-ref-9)
10. State USF is abbreviated as StUSF. [↑](#footnote-ref-10)
11. Mandatory Extended Area Service is abbreviated as ManEAS. [↑](#footnote-ref-11)
12. Federal Subscriber Line Charge is abbreviated as FSLC. [↑](#footnote-ref-12)
13. The term “minimum” is used here to indicate that the RSC, StSLC , StUSF, ManEAS, and FSLC values for single rates (as opposed to multiple rates) because such values are recorded in the survey data set as a “minimum” value. [↑](#footnote-ref-13)
14. *Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform – Mobility Fund*; WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN Docket No. 09-51, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17751, para. 238 (2011) (*USF/ICC Transformation Order and/or FNPRM*); *aff’d sub nom., In re: FCC 11-161*, 753 F.3d 1015 (10th Cir. 2014)*.* [↑](#footnote-ref-14)
15. *See* USF/ICC Transformation Order, 26 FCC Rcd at 17694, para. 84. [↑](#footnote-ref-15)