

West Virginia Geological and Economic Survey

# State Broadband Mapping Methodology

For the State of West Virginia, April 2012

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## Overview

This document gives a summary of the data collection, normalization and verification processes used by the State of West Virginia (State) for the April 2012 data submission to the National Telecommunication and Information Agency (NTIA) in accordance with the State Broadband Data Development (SBDD) program. While most of the processes used in this data submission remained the same as ones for the previous submissions, there were additional adjustments made to continue to refine the process to receive 2010 census geography from the providers in more efficient ways. The State of West Virginia interactive broadband map continues to provide the broadband coverage information to the public and is able to receive comments and feedback from consumers and citizens of the state.

## Purpose

This documentation was developed to illustrate the processes used during the data collection, normalization and verification processes. The information within this document will provide a background to the development of the provider list and data request, and specific issues encountered by West Virginia regarding data collection, normalization and validation.

## Data Sources

### *Provider List*

The provider list for this fifth round of data collection started during the first round of data collection. For this round, the list was regenerated to include any new providers within the state. The list was created by contacting the West Virginia Cable Telecommunications Association, the West Virginia Public Services Commission (PSC) and the West Virginia Broadband Deployment Council. The state receives an updated provider list from the PSC every six months. This information was compiled and compared against the list from the Federal Communications Commission (FCC). Providers were then contacted using information provided by the FCC's public information search Web tool. Providers who were contacted during the first round of data were contacted again through the same name and address. If a provider contacted during the first round had given more detailed contact information for a specific individual, those individuals were contacted instead of the contact provided by the FCC.

The provider list is updated every six months to reflect any mergers or acquisitions that have occurred. There are some legal issues when a merger occurs, but the data integration does not occur until up to a year later. In those circumstances, the data is kept separate until a full merger occurs.

## Data Gathering

### *Provider Data Request*

This component of the project was heavily reliant on working with service providers to obtain data. Each identified provider was mailed a standard data request outlining the elements identified in the Notice of Funds Availability (NOFA) Technical Appendix that were requested from providers. This request included information regarding the availability of broadband services, technology used to provide them, the location of certain broadband infrastructure and the speed of the service. Data was requested to be submitted in the form of census block lists and service area boundaries, including address level and street segment data. If a provider was unable to fulfill such requirements, the West Virginia Geological and Economic Survey (WVGES) worked with those providers to gather the necessary data in an alternative approach. For this round of data collection, an updated guide for broadband data submission was developed for the providers. Along with this guide, a letter outlining the continued overall goals of the broadband mapping program and the objectives of the new updated guide were sent to each provider. The guide was developed to continue to standardize the data received from providers, including modifications and updates that have been made to the requirements by the NTIA since the original Technical Appendix.

Examples of the letter and guide are provided in Appendix A and Appendix B in this document. All of the providers that submitted census block information for this submission provided census 2010 geometry or census block numbers. However, no providers submitted TLIDs for roads as described within the new guide. Without TLIDs, roads need to be hand selected or geocoded, which can lead to some additional processes and inaccuracies because of the limitations described in the Geocoding Issues section.

After the initial data request was mailed, follow up phone calls and emails were made to remind providers of due dates and to collect any missing or unclear data. As of this submission, the response rate from providers continues to be over 90 percent. After data was received, the data was normalized per NTIA standards and placed into the provided geodatabase. WVGES continued to operate under the same assumption as used in the first round of data gathering. WVGES let the data “speak for itself” and did not make any grand assumptions or estimates in the interest of maintaining clean and accurate data.

Providers submitted only maximum advertised speed data. Providers have not been very willing to submit typical speed data as the typical speeds are generally lower than the advertised speeds. Advertised speed data was given by all providers and then pushed to typical speeds as per NTIA’s advice in the Round 3 data review conference call.

In addition to the data request, each provider was required to sign a Nondisclosure Agreement (NDA) between themselves and WVGES. The NDA outlined how provider data would be handled and what portions of that data would be considered confidential, which would be shared with the NTIA and which were to be made publically available.

### **Coverage Information**

Data was derived and normalized into four formats in accordance with the data model:

- Census blocks (2010) of two or less square miles
- Street segments (2010) of census blocks greater than two square miles
- Address level (geocoded point data)
- Wireless area (shapefile)

The normalization procedures were as follows:

- Determine service being provided – what technologies are being used to provide the service
- Understand data/determine how to process – determine which feature class in the geodatabase data belongs
- Georeferencing/geocoding necessary data – georeferencing data for wireless area coverage and other service area maps, as well as geocoding address level data
- Segregating data into NOFA compliant formats – completely filling in geodatabase fields, as well as making sure topology is correct
- Quality assurance/quality control (QA/QC) – verification and validation of data

Typically there were two main types of data supplied for normalization – service area maps and flat Excel tables.

Service areas were georeferenced, digitized and then intersected with the master blocks and roads files. These blocks and road segments were then loaded into the geodatabase and the additional company specific data was appended to those records.

Flat Excel tables were exported to a database and then joined with the FIPS ID for the block files and the TLID for the roads files. The joined fields were exported and then imported into the database. NTIA has not required this information and in cases where a TLID was not given by the provider there was much greater difficulty and inaccuracy as roads had to be geocoded and hand selected.

## ***Geocoding Issues***

The West Virginia Statewide Addressing and Mapping Board (SAMB) information is not yet completed across all of the counties in West Virginia, leaving areas within the State without complete or verified address information. This led to low geocoding match rates of provider supplied information, especially in rural areas, throughout the data normalization workflows. For some of these areas, additional broadband coverage processes were used to derive coverage estimates described in the next section.

## ***Other Issues***

Another issue of incomplete broadband coverage was due to the acquisition of Verizon by Frontier. When Frontier submitted digital subscriber line access multiplexer (DSLAM) locations for the April 1, 2011 deadline it did not include the entire Verizon infrastructure. Frontier has since re-submitted its DSLAM locations for the October 1, 2011 deadline, which now should include those missing Verizon DSLAMs and the coverage map has been extended into certain areas that were not previously included.

For the April 1, 2012 data submission, in order to avoid generating errors when running the current NTIA QC Script, "9999" was used as the default elevation value in the Middle Mile table, instead of "-9999."

## ***Additional Data Processing Techniques***

Because of geocoding inconsistencies in certain areas of the State, some provider address information could not be mapped and other data processing techniques had to be implemented to create broadband coverage estimates. In cases where DSLAM points were able to be provided, broadband coverage was mapped by loading the DSLAM points into Environmental System Research Institute's (ESRI's) Network Analyst. For this processing, the West Virginia State SAMB street centerlines were used as the source roads. DSLAM points were loaded into the facilities point feature class of the service area template using a 1000 foot snapping tolerance to help locate points to nearest roadway. Any points still not connecting to the road network were viewed and manually linked to the road network. Processing was run to create segment lines for each point and to create a detailed polygon area around each street segment area for each point. A 15,000 foot distance parameter was used and no impedances were placed on the streets.

Once the process was run, the created segment lines and polygon areas were linked to the original DSLAM point attribute table and exported from the analyst dataset into standalone polygon and line feature classes. These two feature classes were clipped to the provided wire center boundaries. These coverage areas were used to select covered census blocks and street segments for the data submission. Final broadband coverage estimates were reviewed with the provider prior to final submission.

Another unique processing issue occurred when providers submitted address-level fixed wireless data which would produce error through the new data model. As per discussion with NTIA, the unlicensed fixed wireless points were plotted and then buffered out to 800 feet. A shapefile was created and moved to the wireless feature class within the geodatabase.

One of the foremost issues of the fourth round of data collection, submitted in October 2011 was converting to 2010 Census Blocks. NTIA's decision to switch to 2010 Census Blocks did not leave much time during that data collection window to notify providers of the change. Many providers submitted 2000 Census Blocks, not 2010 Census Blocks. The conversion led to multiple inaccuracies between Round 3 and Round 4 submissions because of the problems intersecting 2000 Census Blocks with 2010 Census Blocks and errors of commission. Many block boundaries had been redrawn and the crosswalk file provided by the Census was in a very unwieldy format and not much help. For this fifth round submission, most of the providers submitted 2010 Census Block information and with the previous submission base data having been already

converted to 2010 Census Block information, the processing techniques for 2010 Census Blocks has become integrated into the long-term maintenance process.

### ***FRN Number Discrepancies***

Discrepancies between Round 2 and Round 3 data submissions were noticed concerning FCC Registraton Numbers (FRNs). Effected providers were contacted directly to clear up these issues. FRNs that were loaded into the database come from direct contact with providers. FRNs are verified as a continued validation process during each data collection period.

## **Community Anchor Institutions**

The process used to identify the Community Anchor Institutions was based on the information provided by NTIA. This included the categories of schools K-12, libraries, medical/healthcare, Public Safety, higher education and other community support consisting of either government or nongovernmental facilities.

All public schools in West Virginia were used for the K-12 category. Libraries consisted of all public libraries throughout West Virginia. Medical/healthcare included hospitals, nursing homes and primary care centers. The primary care centers are made up of main locations of the primary care centers along with satellite clinics and school-based health centers. Public Safety consisted of West Virginia police departments along with the correctional facilities and juvenile centers, fire departments and 9-1-1 centers. Higher education consisted of public and private universities located across West Virginia. The community support consisted of courthouses, regional development centers and workforce locations.

There was a cutoff created to focus on identifying main facilities as Community Anchor Institutions (CAIs). However, if there is a need to go and include more facilities, the State is open to adding those facilities for future updates.

The following agencies were contacted for information: West Virginia (WV) Department of Education, WV Library Commission, Hospitals located throughout the state, Nursing Homes located throughout the State, WV Division of Primary Care, WV Primary Care Association, WV 9-1-1 Center Directors, WV Emergency Management Directors, WV Regional Jail Authority, WV Higher Education Policy Commission, WV Courthouse Facility Improvement Authority, WV Workforce, WV Regional Development Centers and county addressing coordinators.

Data was collected and verified by the West Virginia Division of Homeland Security. Surveys were sent out to various facilities and included a section where their primary city-style address could be filled in. For those facilities that returned the survey, the statewide addressing and mapping data that the counties provided was used as a way to verify the address. Once the location was verified the latitude and longitude coordinates were added. In cases where surveys were not returned, the statewide addressing and mapping data was used to determine if the information could be matched. If this wasn't possible, then the Internet was used to find a Webpage with additional information. If this method was not successful, attempts were made to contact the facility directly. At this point in time, there is approximately a 90-95 percent match rate for the location of the CAIs.

Since the October 2011 data submission, additional surveys were sent by mail to healthcare facilities and fire, police and ambulance locations throughout the state. This amounted to approximately 1,500 surveys that were mailed out. Based on the information that was received back from the surveys, the primary city-style address, broadband technology, speeds and other attributes associated with the community anchor institution feature class were verified and updated where necessary. An on-line survey is planned to be released leading up to the October 2012 data submission with the objective of receiving further updates and also getting the survey, via email address, to those locations where the survey sent by mail was returned by the United State Postal Service due to invalid address information or a facility having changed location. Also, for the April

2012 submission, there are additional community anchor institution locations that are included in the map due to the NTIA allowing some 'unknown' classifications for attributes within the community anchor institution feature class.

## Validation and Verification

Throughout the data gathering and data preparation processes for each data submission, the data verification has been continuous and has evolved based on the evolution of the data model. The focus has been on getting complete data from all providers and assuring that all data can be processed into the required data model for submission. Where providers did not submit data in acceptable formats for data normalization into NOFA formats or where they did not submit complete data or any data, there has been continued focus on working with the providers by WVGES to continue to improve the source information being provided. Data verification and validation is an on-going, long term process that will continue to evolve throughout the broadband data development program. With the fourth data submission in October 2011 being a much more complete broadband coverage across the State because of additional data supplied by providers, additional data verification methods, beyond what has been implemented to date, continue to be evaluated to refine the map, where applicable. This fifth submission incorporated further refinement to validate the provider supplied information against the Census 2010 geographies. Limited research was performed for specific areas of the map where any user feedback points to a gap in coverage or an over-estimate in coverage. The research was limited due to a small sampling of user feedback at this time. Plans to advertise surveys and the interactive broadband map continue to be executed and are described further in other sections of this document.

### Validation Processes

Data validation begins within the data collection process to determine if the data submission by providers is formatted in a way that can be normalized into the required NOFA formats. Where data is deemed incomplete or in non-conforming standards, WVGES staff reached out to providers as necessary to improve the data submissions. After each round of data preparation the format for the updates being collected has improved.

Quality assurance and quality control has been a big focus of the data validation of the submittals assuring that the required data fields are populated properly and that data fields are populated with values that follow the data model rules. As the data model has evolved over each round of data submission these QA/QC checks have been modified to include the changes in fields, values, domains, etc. that are being required for submission.

Validation methods employed include the following:

- Assuring all applicable providers' datasets are propagated forward to each round of data collection
- Verifying that all required fields are populated with valid values and default values are used when appropriate. This includes:
  - Speeds valid for the technologies reported
  - Latitude/longitude coordinates fall within an acceptable range, given the state boundaries
  - The relationships between maximum and typical, and downstream and upstream speeds are valid
  - Service reported at the block level is done using blocks of the appropriate size (less than two square miles)
  - Speeds and technologies reported per provider are consistent between blocks and segments
  - Administrative information (provider name, doing business as [DBA] Name, FRN) is consistently reported per provider in each populated feature class.

### Outreach to Providers

To further assure the providers' broadband footprints would be accurately represented in data submissions, "check maps" depicting each respective provider's served small census blocks and segments located in large blocks were distributed back to providers. Providers were requested to either approve their check maps as-is, or submit additional changes if their



coverage was not accurately represented. Any modifications received as a result of this effort were incorporated into the broadband coverage maps. WVGES plans to incorporate future data reviews with providers using web collaboration tools.

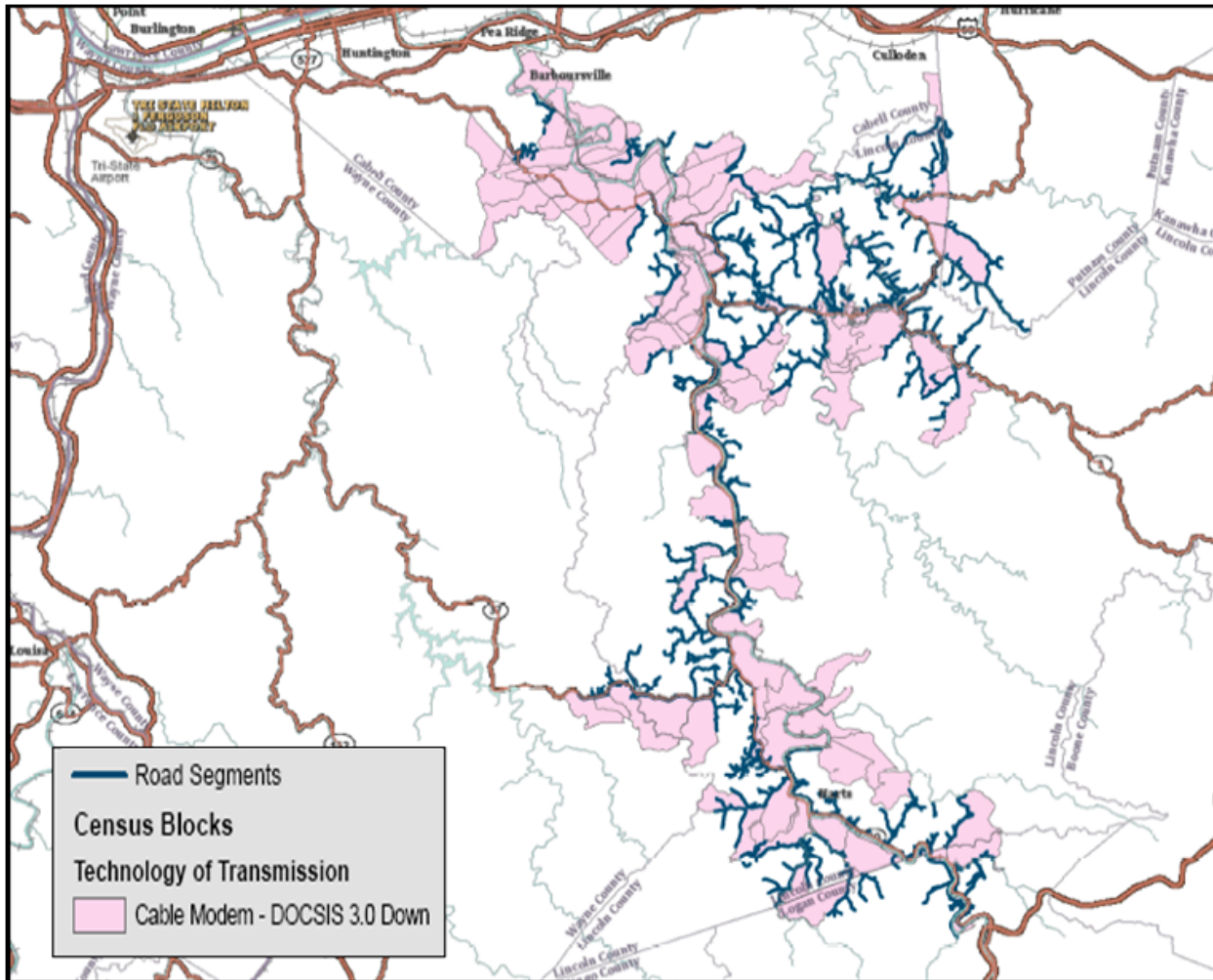


Figure 1—Example of a portion of a provider check map

The validation process for the April 2012 submission includes the use of the Python scripts for validation provided by NTIA.

### Third Party Datasets

As data collections and data normalization processes progressed, additional validation was conducted using commercially available datasets. The following commercially available datasets were used as a reference for the specific technologies that their data represented.

- American Roamer datasets
- TeleAtlas Exchange boundaries
- Media Prints Cable boundaries

These datasets were used primarily as a validation source for provider service coverage.



## State Broadband Interactive Map

The State of West Virginia released its interactive broadband mapping Website to the public in May 2011. The Website address is [www.wvbroadbandmap.org](http://www.wvbroadbandmap.org). The Website provides consumers the opportunity to review broadband availability across the State.

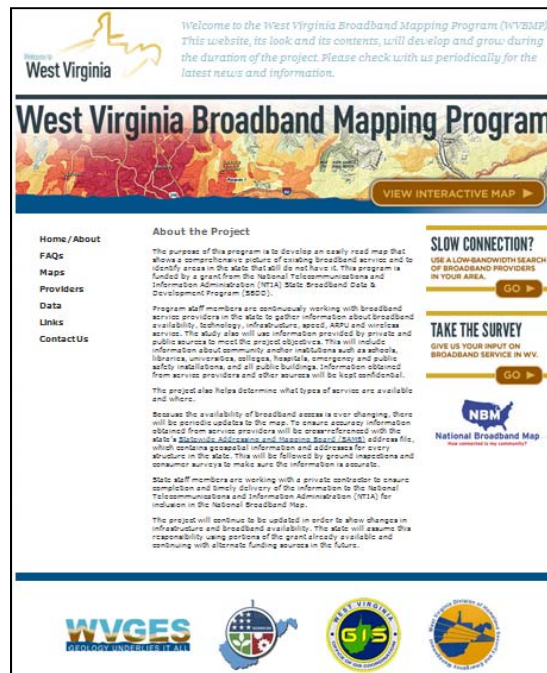


Figure 2—WVBMP main landing page

The main landing page for the West Virginia Broadband Mapping Program (WVBMP) provides background information on the program, contact information and a frequently asked questions section. The landing page has the main link to the broadband coverage map and a link to an address lookup tool for users with slow internet connections. This will allow them to view what coverage is available around their address or zip code without needing to view the entire map, which might not be feasible for users who might still be on dial-up connection speeds. By having this slow internet connection coverage tool, it allows feedback from those consumers even if they do not have the capabilities to bring up the interactive map application.

The Web application has the functionality for consumers and citizens using the State broadband map Web application to submit comments and feedback. The information gathered from that feedback is being reviewed as more potential source information for validating and determining confidence levels of the broadband coverage across the regions of the State. By comparing comments supplied by consumers about broadband availability to the broadband coverage, trends could be recognized where potential inconsistencies in the existing broadband map could exist. This could delineate the need for further focused validation or verification in specific areas that could refine the broadband coverage information for future data submissions.

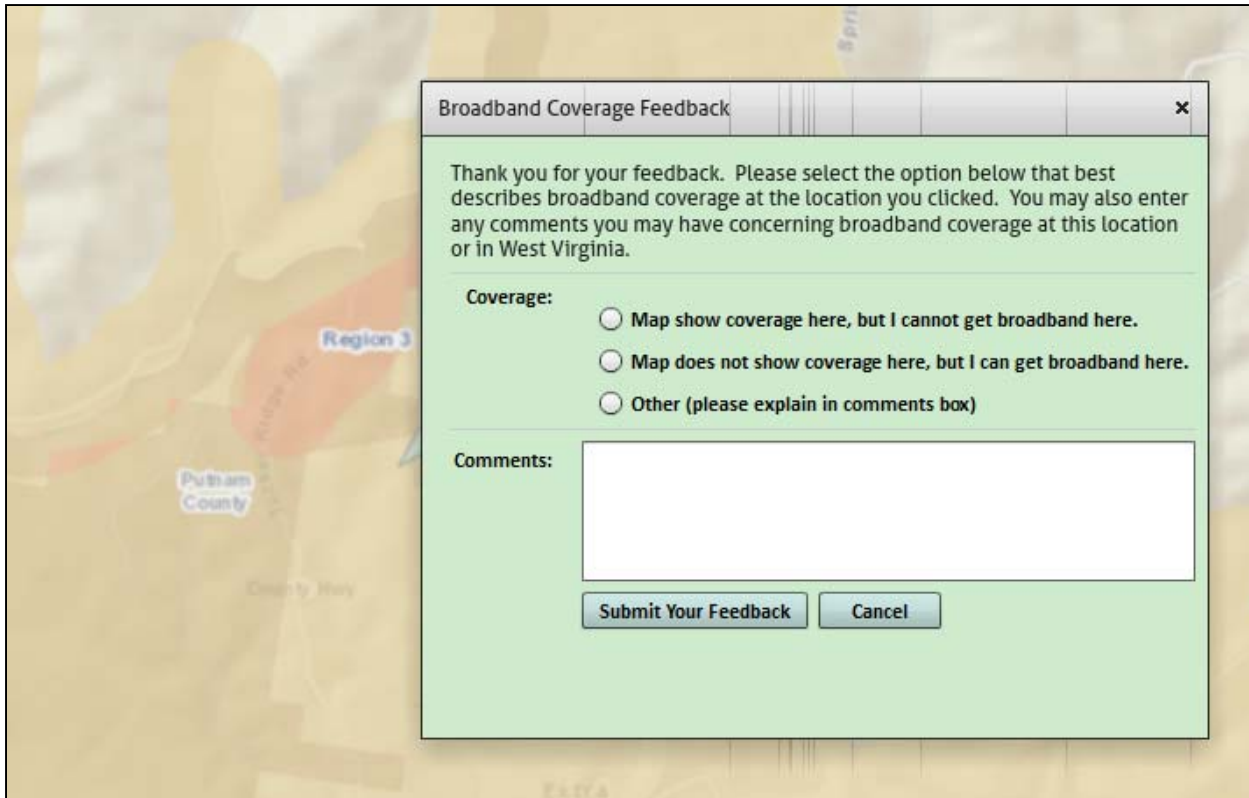


Figure 3—Example of feedback tool interface

For users that can browse the interactive map, they can click on any location on the map and choose to provide specific feedback for that location. This will store the coordinate information of the location that they selected allowing them to choose from a couple of coverage categories for their comment or choose other. Within the feedback tool, they can type in more specific details about their broadband coverage.

After the initial release of the broadband map, there was some initial feedback and comments mainly pertaining to a few areas that were not showing coverage. The feedback indicated that there should be coverage or scenarios where we were showing coverage. One resident made a comment that there was not cable service on a particular road or area. Some of the missing coverage was due to the acquisition of Verizon by Frontier as discussed above.

The State continues to implement plans to incorporate more advertising to the interactive broadband map and feedback tools. Continuing to work more closely with the regional planning councils to review coverage in their communities, a plan to include an advertisement of the interactive broadband map into local phone bills is being developed.

A speed test has been developed within the WVBMP interactive Website. The design of the Website includes links to the speed test developed using the Ookla broadband speed test tools. The speed test is embedded within a broadband survey wizard that allows consumers to provide specific information that will help the State analyze information about use and demand for broadband within the State. To get more users to take the speed test to obtain more results for analysis over the next six months, the speed test will be advertised along with the interactive Website. Speed test results and statistics will be leveraged to compare against the existing broadband coverage and help validate speed information. As stated previously, this could assist in determining if there are any trends or patterns in the information that could be an additional tool for prioritizing areas where more refined verification and validation might need to occur. To date there is still a lack of substantial data collected via the speed-test or surveys to be able to detect patterns or trends and continued planning within the regional planning councils could provide more exposure to the web sites and speed test at the grass roots level. Links to the speed

test and the interactive map have also been added to additional web sites, including a new West Virginia Broadband Deployment Council web site ([www.broadband.wv.gov](http://www.broadband.wv.gov)) that was launched at the end of 2011.

### ***Future Steps for Validation***

Future plans for data validation continue to include establishing confidence levels to assign to broadband coverage based on comparisons with other source information collected, such as feedback from crowd sourcing results from the State broadband map and the national broadband map. Confidence rankings will be used to prioritize any areas where additional verification techniques might be used (consumer and business surveys).

As part of continued broadband planning activities and future validation of data, a third party dataset from Infogroup has been purchased. For broadband map validation, the Infogroup datasets provide consumer broadband use information including coordinate based location information along with provider name and technology that is being used by that particular consumer. The Infogroup data will allow the consumer information to be plotted on the map and compared against existing coverage maps to determine if there are any trends within the Infogroup data that help to determine where additional validation needs to occur. For example, there may be clusters of consumer points for a particular provider that exists in an area of the State where there is no coverage for that provider. The goal would be to identify the major patterns or trends that might need to be re-visited with a provider, if data appears to be missing. As of the March 2012, the Infogroup data has now been received and is being formatted for the analysis purposes described above and will be used to compare to existing broadband coverage.

Another dataset that is being considered for purchase for broadband planning activities and broadband demand analysis is Telogical's broadband statistical datasets that provide pricing information. Included in the datasets is information on broadband maximum advertised speed by providers which could help validate some of the speed data within the broadband mapping datasets.

Throughout the broadband data development program, as addressing information from the State Addressing and Mapping Board's addressing datasets are continually updated, address point information from providers will continually be re-verified prior to each submission to NTIA to improve geocoding results and refine the broadband coverage areas.

## **Providers**

### ***Non-Responsive Providers***

Names of providers who were non responsive will be passed along to the WV Geographic Information Systems (GIS) Coordinator's Office to be contacted again.

#### ***Atlantic Broadband LLC***

DBA: Atlantic Broadband, LLC

FRN: 0009596883

This provider was contacted eight times. Data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

#### ***\*\*Skyweb, Inc***

DBA: SKYWEB Inc.

FRN: 0018516799

\*\*Tower locations were provided along with additional information for each tower site. Two computerized propagation studies were performed to approximate coverage for a local provider supplying broadband data. The two studies were predicted in the 900 MHz and 2.4 GHz bands that are utilized at these locations. The data was received from the provider that defined the tower sites currently utilized to provide coverage. Parameters provided include site locations, ground elevation, transmit power, antenna height above ground, and antenna gain. All of these components were compiled into EDX Signal software

program which calculates the associated link budget and in which the program takes into account terrain and land use land clutter (LULC). Propagation studies show potential coverage throughout the area. Additional assumptions made include a predicted reliability of 90 percent for any signal received by a device and no additional signal loss was taken into account for signals received inside buildings which may further impact the coverage predictions. Coverage areas based on the propagation studies do not seem to represent realistic coverage patterns and will need to be reviewed again with SkyWeb in the future.

### **Satellite Providers**

Data requests sent to Satellite providers were met with the response of "We provide to the entire state." Attempts made at gathering more detailed data sets were unsuccessful for this round of data collection. Further attempts will be made for the next round of data collection.

#### **Hughes Communications, Inc.**

DBA: HNS Licensuse Sub, LLC

FRN: 0018483073

Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

#### **StarBand Communications Inc.**

DBA: StarBand Communications Inc.

FRN: 0005087457

Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

#### **WildBlue Communications, Inc.**

DBA: WildBlue Communications, Inc.

FRN: 0007843766

Detailed data was not provided by the April submittal date. Further attempts at data gathering will be made in the next round of data collection.

### **Provider that Submitted Data**

| Provider Name                     | DBA Name  | FRN        |
|-----------------------------------|---|------------|
| Armstrong Holdings, Inc.          | Armstrong Telephone Company - Northern Division | 0004311528 |
| Armstrong Holdings, Inc.          | Armstrong Telephone Company-WV                  | 0004379731 |
| Armstrong Holdings, Inc.          | Armstrong Utilities, Inc.                       | 0003765617 |
| AT&T Inc                          | New Cingular Wireless Services, Inc.            | 0003766532 |
| Broadview Networks Holdings, Inc. | Broadview Networks Holdings, Inc.               | 0010296853 |
| Cequel Communications, LLC        | Suddenlink Communications                       | 0015784663 |
| Citizens Communications Company   | Frontier Communications Corporation             | 0003576352 |
| City of Philippi                  | City of Philippi                                | 0001984244 |
| Comcast Corporation               | Comcast Cable Communications Inc.               | 0003768165 |
| Community Antenna Service, Inc.   | Community Antenna Service Inc.                  | 0004966131 |
| Deutsche Telekom AG               | T-Mobile USA, Inc.                              | 0006945950 |

| Provider Name                                   | DBA Name  | FRN        |
|---|---|------------|
| Gateway Telecom, LLC                            | Gateway Telecom LLC                             | 0018536623 |
| Hardy Telecommunications, Inc.                  | Hardy Telecommunications Inc                    | 0002008043 |
| Hardy Telecommunications, Inc.                  | Hardy Telecommunications, Inc CLEC              | 0013169313 |
| Hickory Tech Corporation                        | Enventis Telecom Inc.                           | 0008394322 |
| Inter Mountain Cable, Inc.                      | Inter-Mountain Cable Inc                        | 0001789080 |
| Inter Mountain Cable, Inc.                      | Mikrotec CATV, LLC                              | 0014471288 |
| JB-Nets   | JB-Nets   | 0016474868 |
| Leap Wireless International, Inc.               | Cricket Communications, Inc.                    | 0002963528 |
| Level 3 Communications, LLC                     | Level 3 Communications, LLC                     | 0003723822 |
| Level 3 Communications, LLC                     | Broadwing Communications, LLC                   | 0008599706 |
| LightEdge Solutions, Inc                        | LightEdge Solutions, Inc.                       | 0015546443 |
| Metropolitan Telecommunications Holding Company | Metropolitan Telecommunications Holding Company | 0009806019 |
| Micrologic, Inc.                                | Micrologic, Inc.                                | 0018675256 |
| New Edge Holding Company                        | New Edge Network, Inc.                          | 0003720471 |
| NTELOS, Inc.                                    | NTELOS Communications Inc.                      | 0004342762 |
| NTELOS, Inc.                                    | West Virginia PCS Alliance, L.C.                | 0002049328 |
| Otelco Inc.                                     | War Acquisition Corp                            | 0018657858 |
| Qwest Communications International, Inc.        | Qwest Communications Company, LLC               | 0003605953 |
| Shenandoah Telecommunications Company           | Shentel Cable Company                           | 0018024075 |
| Sprint Nextel Corporation                       | Sprint Nextel Corporation                       | 0003774593 |
| Spruce Knob Seneca Rocks Telephone, Inc.        | Spruce Knob Seneca Rocks Telephone, Inc.        | 0004337002 |
| TelAtlantic, Inc.                               | West Side Telecommunications                    | 0002009405 |
| TelAtlantic, Inc.                               | Communications Plus, Inc.                       | 0009281262 |
| Time Warner Cable LLC                           | Time Warner Cable LLC                           | 0013430244 |
| TW Telecom inc.                                 | tw telecom holdings inc.                        | 0014942668 |
| Verizon Communications Inc.                     | Cellco Partnership                              | 0018506568 |
| Verizon Communications Inc.                     | Verizon Business Global LLC                     | 0010856284 |
| Verizon Communications Inc.                     | Verizon West Virginia Inc.                      | 0002011278 |
| Visual Link Internet LLC                        | Visual Link Internet LLC                        | 0017645813 |

Table 1—Providers That Have Submitted Data for SBDD Program

## **Appendix A WVGES Provider Data Request Letter**

The WVGES Provider Data Request Letter can be found on the following page

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# **WEST VIRGINIA**

## **GEOLOGICAL AND ECONOMIC SURVEY**

1 Mont Chateau Road  
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*  
Keith Burdette, *Secretary, Department of Commerce*  
Michael Ed. Hohn, *Director and State Geologist*



Phone: (304) 594-2331  
Fax: (304) 594-2575  
E-mail: [info@geosrv.wvnet.edu](mailto:info@geosrv.wvnet.edu)  
Web Site: <http://www.wvgs.wvnet.edu>

January 6, 2012  
(Address of Recipient)

### **Re: Data Request in Compliance with the State Broadband Data and Development Grant Program and the Broadband Data Improvement Act**

#### **Response Requested by March 1st, 2012**

**Dear < >:**

The West Virginia Geological and Economic Survey (WVGES) must collect certain data regarding the availability of broadband services, technology used to provide them, and the location of certain broadband infrastructure. The WVGES is required to provide the collected data to the NTIA every six months beginning March 2010 until October 2014. Entities that provide broadband service, as defined below, on either a commercial or noncommercial basis within West Virginia are subject to this request.

WVGES was designated as the single West Virginia entity eligible to receive a grant under the Broadband Data Improvement Act of 2008 (BDIA), 47 U.S.C. §§ 1301-04. In 2009, the WVGES successfully applied to the National Telecommunications and Information Administration (NTIA) for such a grant, pursuant to the NTIA's Notice of Funds Availability (NOFA).

The NTIA's State Broadband Data and Development Grant Program Notice of Funds Availability, Docket No. 0660ZA (July 8, 2009) (NOFA), defines broadband as follows:

...two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users...

Please note that the broadband inventory maps derived from these data may result in government-subsidized broadband deployment in unserved and underserved areas. Providers that do not respond may face subsidized competition in areas they already serve.



Attached to this request are the Technical Appendix to the NOFA and a technical appendix written by the WVGES to clarify the data that needs to be collected. **Please note this appendix is new as of January 1, 2012.** These documents outline the broadband availability information WVGES is required to collect. Every broadband service provider within the state of West Virginia is expected to provide the information specified in the attached documents to WVGES **no later than March 1st, 2012**, in the format WVGES has specified.

#### **Six Month Update:**

Pursuant to the BDIA and the NOFA, WVGES must collect updates on broadband data on a six month rolling basis. **If you had submitted adequate information during the 2<sup>nd</sup> collection period of 2011 and there are no changes to your infrastructure, the WVGES requests a letter stating such.** If infrastructures changes have been made in the interim period, submissions of the changes are required.

#### **Contact Information:**

Please submit the requested data **no later than March 1, 2012** by CD or DVD to Michael "Ty" Clifford, West Virginia Geological and Economic Survey, 1 Mont Chateau Rd. Morgantown WV 26508-8079.

If you have questions about this request, contact Michael "Ty" Clifford by email at [mclifford@geosrv.wvnet.edu](mailto:mclifford@geosrv.wvnet.edu), or by phone at (304) 594-2331.

#### **Nondisclosure Agreement:**

Data submitted to WVGES in response to this request will be protected under the confidentiality requirements set forth in Section 106 (h)(2) of the BDIA. This section states that, "[n]otwithstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the entity." Further, the NOFA states that "[a]s a measure to protect the confidential or proprietary nature of the information received from broadband service providers and other organizations during the data collection phase, awardees may execute nondisclosure agreements (consistent with applicable law) that require awardees to treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except where mutually agreed upon by the information provider and the awardee, provided, however, that any such nondisclosure restriction a) will not restrict the providing of all data collected under this Program to NTIA, nor b) restrict NTIA's use of such data as contemplated under this Notice (including sharing such data with the FCC or other federal agencies)". NTIA expects awardees to enter into such agreements upon the request of the service provider. WVGES believes that these provisions will protect the confidentiality of information that broadband providers submit pursuant to this request and intends to enter into a nondisclosure agreement with any provider that wishes to do so.

Michael Ed Hohn  
Director and State Geologist  
West Virginia Geological and Economic Survey

Additional information may be obtained from the NOFA, available at 74 Fed. Reg. 32,545 or online at <http://broadbandusa.sc.egov.usda.gov>.

Enclosures:

- Letter from Gov. Joe Manchin III to Mr. Larry Strickling, Administrator NTIA (August 12, 2009)
- State Broadband Data and Development Grant Program, Notice of Funds Availability; clarification (August 7, 2009). Available at [http://broadbandusa.sc.egov.usda.gov/broadband\\_mapping.htm](http://broadbandusa.sc.egov.usda.gov/broadband_mapping.htm)
- WVGES Guide to Broadband Submission January 1, 2012

## **Appendix B WVGES Guide to Broadband Submission**

The WVGES Guide to Broadband Submission can be found on the following page.

The balance of this page is intentionally left blank.



January 6, 2012

## **West Virginia Geological and Economic Survey Guide to Broadband Submission**

### **Purpose:**

Several changes in submission guidelines have been made by NTIA since the writing of the original Technical Appendix. This document clarifies what is preferred and required for submission and the original NTIA Technical Appendix no longer adequately describes what is required.

### **Broadband definition:**

Broadband Service is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

### **2010 census requirements:**

Beginning in June 2011, all census block and road information **must be derived from 2010 Census Data**. All block and road data submitted **must have a unique identifier present**, such as census block # or TLID.

The WVGES has created two shapefiles which contain all census blocks in West Virginia less than 2 square miles and all roads contained in census blocks greater than 2 square miles. All census and road data must correspond to these master files.

The shape files are located at:

<https://dssfm.kimballdata.com>

Username: censusdata

Password: censusdata#1

### **Data preferences:**

The WVGES prefers data to be submitted in the following order of preference:

- ESRI shapefile format with all required fields submitted.
- Service area boundary with defined speeds and fields that can be converted to blocks and roads.
- Flat Excel or comma-delimited files that contain all data field and unique identifiers.

## **Data Types and required fields:**

### **Wireless Services not Provided to a Specific Address – Shapefile**

Facilities-based providers of wireless broadband service that is not address specific (e.g., nomadic, terrestrial mobile wireless, or satellite), may provide WVGES with GIS-compatible shapefiles depicting areas in which broadband service is available to end users.

For this purpose, an “end user” of broadband service is a residential or business party, institution, or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access service. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end-users at that location. The data shall be submitted to WVGES as an ESRI Shapefile such that the associated data contains the following fields:

- Instructions for providers needing to obtain a FRN can be accessed at <https://fjallfoss.fcc.gov/coresWeb/publicHome.do>.
- All map areas must be closed, non-overlapping polygons with a single, unique identifier.
- Any variation in any of the required fields necessitates the creation of a separate closed, non-overlapping polygon.
- In the area covered by each polygon, subscribers must have broadband service with the speed characteristics shown in the data record 95% of the time to within 50 feet of the polygon’s boundary.
- The technology of transmission should be entered as an integer based on the coding scheme shown below.
- The speed tiers should be entered as integers according to the reference in below.
- The data must be expressed using the WGS 1984 geographic coordinate system.
- Maps must be accompanied by metadata or a plain text “readme” file that contains a comprehensive explanation of the methodology employed to generate the map layer including any necessary assumptions and an assessment of the accuracy of the finished product.
- Since ESRI Shapefiles typically consist of 5 to 7 individual files including the associated metadata and geodatabase, data for the entire state or territory should be submitted as a single, zipped file containing all the component files. The file should be named “area\_availability\_XX.zip” where XX is the two-letter postal abbreviation for the state or territory.

**Record Format for Availability Area Data for Each Provider – Use Only in Connection with  
Wireless Services not Provided to a Specific Address**

| Field                               | Description   | Type    | Example         |
|-------------------------------------|---|---------|-----------------|
| Provider Name                       | Provider Name   | Text    | ABC Co.         |
| DBA Name                            | “Doing-business-as” name  | Text    | Superfone, Inc. |
| FRN                                 | Provider FCC Registration Number  | Integer | 8402202         |
| Technology of Transmission          | Category of technology for the provision of service (see details following Part 1(a) for codes)   | Integer | 41              |
| Spectrum Used                       | If technology of transmission is wireless, is Cellular spectrum (824-849 MHz; 862-869) used to provide service (Y/N)?   | Text    | Y               |
| Spectrum Used                       | If technology of transmission is wireless, is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 805-806 MHz) used to provide service (Y/N)?   | Text    | Y               |
| Spectrum Used                       | If technology of transmission is wireless, is Broadband Personal Communications Services spectrum (1850-1915 MHz; 1930-1995) used to provide service (Y/N)?   | Text    | Y               |
| Spectrum Used                       | If technology of transmission is wireless, is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service (Y/N)?   | Text    | N               |
| Spectrum Used                       | If technology of transmission is wireless, is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service (Y/N)?   | Text    | N               |
| Spectrum Used                       | If technology of transmission is wireless, is Unlicensed (including broadcast television “white spaces”) spectrum used to provide service (Y/N)?  | Text    | N               |
| Spectrum Used                       | If technology of transmission is wireless, but the spectrum used to provide service is not listed above, please identify as one of the following: Specialized Mobile Radio Service (SMR) (817-824 MHz; Spectrum Used 862-869 MHz; 896-901 MHz; 935-940 MHz), Wireless Text SMR Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz, Satellite (L-band, Big LEO, Little LEO, 2 GHz). | Text    | SMR             |
| Maximum Advertised Downstream Speed | Speed tier code for the maximum advertised downstream speed available (see details following Part 1(a) for codes)   | Integer | 8               |

|                                   |   |         |   |
|-----------------------------------|---|---------|---|
| Maximum Advertised Upstream Speed | Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available (see details following Part 1(a) for codes)  | Integer | 8 |
| Typical Downstream Speed          | Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes). | Integer | 8 |
| Typical Upstream Speed            | Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).     | Integer | 8 |

### **Middle Mile and Backbone Interconnection Points**

In addition to the information shown in the tables below, awardees shall provide NTIA with a list of interconnection points of facilities in their state that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points").

Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured.

Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks including the internet.

These data shall be submitted to NTIA as a tab-delimited text file in which each record has the following format:

- Instructions for providers needing to obtain a FRN can be accessed at <https://fjallfoss.fcc.gov/coresWeb/publicHome.do>.
- The capacity of the serving facility should represent the capacity as currently configured and be expressed according to the following reference:
- Coordinates must be expressed using the WGS 1984 geographic coordinate system.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "middlemile\_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.



## Record Format for Middle-Mile and Internet Backhaul Connection Points Data for Each Provider

| Field                     | Description  | Type    | Example         |
|---------------------------|--|---------|-----------------|
| Provider Name             | Provider Name  | Text    | ABC Co.         |
| DBA Name                  | Doing-business-as name   | Text    | Superfone, Inc. |
| FRN                       | FCC Registration Number  | Integer | 8402202         |
| Ownership                 | Is the facility owned (0) or leased (1)?   | Integer | 0               |
| Serving Facility Capacity | Serving capacity of transport facility (see details below)   | Integer | 1               |
| Serving Facility Type     | Type of transport facility (1=Fiber; 2=Copper; 3=Hybrid Fiber Coax (HFC); 4=Wireless)                          | Integer | 1               |
| Latitude                  | Latitude in decimal degrees  | Float   | 38.88456        |
| Longitude                 | Longitude in decimal degrees   | Float   | -77.028123      |
| Elevation                 | Elevation relative to grade to the nearest foot (positive integers indicate above grade, negative below grade) | Integer | -10             |

### Serving Facility Codes

| Data Rate Code | Interconnection Point Data Rate                          |
|----------------|--|
| 1              | Multiple T1s and less than 40 mbps                       |
| 2              | Greater than 40 mbps and less than 150 mbps              |
| 3              | Greater than 150 mbps and less than 600 mbps             |
| 4              | Greater than or equal to 600 mbps and less than 2.4 gbps |
| 5              | Greater than or equal to 2.4 gbps and less than 10 gbps  |
| 6              | Greater than or equal to 10 gbps                         |

### Service Address Service Associated with Specific Address

For each facilities-based provider of broadband service to specified end-user locations in their state, awardees shall provide NTIA with a list of all addresses at which broadband service is available to end users in the provider's service area, along with the associated service characteristics identified below.

For this purpose, "broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the

project area.

For this purpose, an “end user” of broadband service is a residential or business party, institution or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at an address if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to endusers at that address. The list of addresses shall be submitted to WVGES as a tab-delimited text file in which each record has the following format:

- All fields are required.
- Instructions for providers needing to obtain a FRN can be accessed at <https://fjallfoss.fcc.gov/coresWeb/publicHome.do>.
- The ID field is a sequential integer ranging from 1 to the total number of addresses.
- Address data fields should be space-delimited in standardized Postal Service form. See <http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf>.
- Categories of end users should be entered as integers based on the following table.
- For reporting the technology of transmission, report the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer (“downstream” and “upstream”), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following tables.
- Speed tiers should be entered as integers based on the following tables.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named “address\_availability\_XX.txt” where XX is the two-letter postal abbreviation for the state or territory.

#### **Record Format for Address Data for Each Provider**

| Field         | Description                      | Type    | Example         |
|---------------|----------------------------------|---------|-----------------|
|               |                                  |         |                 |
| Provider Name | Provider Name                    | Text    | ABC Co.         |
| DBA Name      | “Doing-business-as” name         | Text    | Superfone, Inc. |
| FRN           | Provider FCC Registration Number | Integer | 8402202         |
| ID            | Sequential record number         | Integer | 1               |

|  |  |         |  |
|--|--|---------|--|
| End User location/Service Data<br>End-User Address | Complete address   | Text    | 1401 Constitution Ave NW Washington DC 20230 |
| End-User Building Number End-User Prefix Direction | Building number Prefix direction   | Text    | 1401   |
| End-User Street                                    | Street name  | Text    | Constitution                                 |
| End-User Street Type End-User Suffix Direction     | Street type Suffix direction   | Text    | Avenue NW                                    |
| End-User City                                      | City   | Text    | Washington                                   |
| End-User State Abbreviation                        | Two-letter state postal abbreviation   | Text    | DC   |
| End-User ZIP Code                                  | 5-digit ZIP code (with leading zeros)  | Text    | 20230  |
| End-User ZIP Plus 4                                | 4-digit add-on code (with leading zeros)   | Text    | 0005   |
| Category of End User                               | Category of End User Served at Address (see details below for codes)   | Integer | 3  |
| Technology of Transmission                         | Category of technology available for the provision of service at the address (see details below for codes)   | Integer | 50   |
| Maximum Advertised Downstream Speed                | Speed tier code for the maximum advertised downstream speed available at the address (see details below for codes)   | Integer | 8  |
| Maximum Advertised Upstream Speed                  | Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available at the address (see details below for codes)  | Integer | 8  |
| Typical Downstream Data                            | Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes) | Integer | 8  |

|                        |  |         |   |
|------------------------|--|---------|---|
| Typical Upstream Speed | Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes) | Integer | 8 |
|------------------------|--|---------|---|

### End User Codes

| End User Category Code | End User Category          | Description   |
|------------------------|----------------------------|---|
| 1                      | Residential                | Address denotes a residential living unit, individual living unit in institutional settings such as college dormitories and nursing homes and other locations designed primarily for residential use at which broadband service is available. |
| 2                      | Governmental               | Address denotes a state or local government location at which broadband service is available.   |
| 3                      | Small Business             | Address denotes the location of a small business.   |
| 4                      | Medium or Large Enterprise | Address denotes the location of a medium or large enterprise.   |
| 5                      | Other                      | Address denotes a location not meeting any of the above descriptions.   |

### Technology of Transmission Codes

| Technology Code | Description              | Details  |
|-----------------|--------------------------|--|
| 10              | Asymmetric xDSL          |  |
| 20              | Symmetric xDSL           |  |
| 30              | Other Copper Wireline    | All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples) |
| 40              | Cable Modem - DOCSIS 3.0 |  |
| 41              | Cable Modem - Other      |  |

|    |   |   |
|----|---|---|
| 50 | Optical Carrier/Fiber to the End User   | Fiber to the home or business end user (does not include "fiber to the curb") |
| 60 | Satellite                               |   |
| 70 | Terrestrial Fixed Wireless - Unlicensed |   |
| 71 | Terrestrial Fixed Wireless - Licensed   |   |
| 80 | Terrestrial Mobile Wireless             |   |
| 90 | Electric Power Line                     |   |
| 0  | All Other                               | Any specific technology not listed above.                                     |

### Speed Tier Codes

| Upload Speed Tier | Download Speed Tier | Description  |
|-------------------|---------------------|--|
| 1                 | --                  | Less than or equal to 200 kbps                           |
| 2                 | --                  | Greater than 200 kbps and less than 768 kbps             |
| 3                 | 3                   | Greater than or equal to 768 kbps and less than 1.5 mbps |
| 4                 | 4                   | Greater than or equal to 1.5 mbps and less than 3 mbps   |
| 5                 | 5                   | Greater than or equal to 3 mbps and less than 6 mbps     |
| 6                 | 6                   | Greater than or equal to 6 mbps and less than 10 mbps    |
| 7                 | 7                   | Greater than or equal to 10 mbps and less than 25 mbps   |
| 8                 | 8                   | Greater than or equal to 25 mbps and less than 50 mbps   |
| 9                 | 9                   | Greater than or equal to 50 mbps and less than 100 mbps  |
| 10                | 10                  | Greater than or equal to 100 mbps and less than 1 gbps   |
| 11                | 11                  | Greater than or equal to 1 gbps                          |

## Census Blocks Less than Two Square Miles

### Record Format for Wireline Service by Census Block

(For Census Blocks no greater than two square miles in area in which broadband service is available to end users)

| Field                               | Description                      | Type    | Example         |
|-------------------------------------|----------------------------------|---------|-----------------|
| <b>Provider Identification Data</b> |                                  |         |                 |
| Provider Name                       | Provider Name                    | Text    | ABC Co.         |
| DBA Name                            | "Doing-business-as" name         | Text    | Superfone, Inc. |
| FRN                                 | Provider FCC Registration Number | Integer | 8402202         |
| ID                                  | Sequential record number         | Integer | 1               |

|  |  |         |                |
|--|--|---------|----------------|
| <b>Census Block Identification Data</b>    |  |         |                |
| Census Block FIPS Code                     | 15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block. Must include leading "0"   | Integer | 60750160001015 |
| Census Block Square Mileage                | Provide square mileage for specific census block number to the first decimal place   | Number  | 1.8            |
| <b>Broadband Technology and Speed Data</b> |  |         |                |
| Technology of Transmission                 | Category of technology available for the provision of service at the address (see details below for codes)   | Integer | 50             |
| Typical Downstream Speed                   | Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes) | Integer | 8              |
| Typical Upstream Speed                     | Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)     | Integer | 8              |

## Roads contained within Census Blocks greater than two square miles

### Record Format for Wireline Service by Street Segment

(For Census Blocks larger than two square miles in area in which broadband service is available to end users)

| Field                               | Description                      | Type    | Example         |
|-------------------------------------|----------------------------------|---------|-----------------|
| <b>Provider Identification Data</b> |                                  |         |                 |
| Provider Name                       | Provider Name                    | Text    | ABC Co.         |
| DBA Name                            | "Doing-business-as" name         | Text    | Superfone, Inc. |
| FRN                                 | Provider FCC Registration Number | Integer | 8402202         |
| ID                                  | Sequential record number         | Integer | 1               |

|  |  |         |                |
|--|--|---------|----------------|
| <b>End User location/<br/>Service Data</b>         |  |         |                |
| Census Block FIPS Code                             | 15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block   | Integer | 60750160001015 |
| Census Block Square Mileage                        | Provide square mileage for specific census block number to the first decimal place   | Number  | 5.8            |
| Street Name  | Provide street name to identify street segment   | Text    | Van Ness       |
| Street Type  | Street type to identify street segment   | Text    | Avenue         |
| Street Direction Prefix                            | Street Prefix to identify street segment   | Text    | N              |
| TLID   | Unique identifier for each street segment  | Text    | 0015874962     |
| <b>Broadband<br/>Technology and Speed<br/>Data</b> |  |         |                |
| Technology of Transmission                         | Category of technology available for the provision of service at the address (see details below for codes)   | Integer | 50             |
| Typical Downstream Speed                           | Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes) | Integer | 8              |
| Typical Upstream Speed                             | Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)     | Integer | 8              |