



**BROADMAP**<sup>SM</sup>  
Beyond The Boundaries

# US Virgin Islands Broadband Mapping Project

## Product Release White Paper

**Contact Name Manager:** Kevin Hughes  
**Contact Phone Number:** 340-715-8581 ext 2231  
**Contact E-mail:** [khughes@vingn.com](mailto:khughes@vingn.com)

**Submitted By:** Renee Judkins, GISP  
**Contact E-mail:** [Renee.Judkins@broadmap.com](mailto:Renee.Judkins@broadmap.com)

**Product Specification:** December 2013 NTIA Data Model  
**Product/Process:** NTIA—October 1, 2014 Data Deliverable  
**Dataset Submission QC:** NTIA—SBDD\_CheckSubmission.py



**BROADMAP**  
Beyond The Boundaries

# Table of Contents

|   |           |
|---|-----------|
| <b>OVERVIEW .....</b>   | <b>3</b>  |
| <b>SUBMISSION SUMMARY .....</b>   | <b>3</b>  |
| <b>PROVIDER DETAILS .....</b>   | <b>3</b>  |
| PROVIDER PARTICIPATION .....  | 3         |
| <b>COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS .....</b>   | <b>4</b>  |
| OVERALL STATISTICS .....  | 4         |
| <b>HIGH-LEVEL SUMMARY .....</b>   | <b>4</b>  |
| <b>DATA GATHERING .....</b>   | <b>4</b>  |
| BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND<br>SERVICE OVERVIEW ..... | 4         |
| COMMUNITY ANCHOR INSTITUTION (CAI) .....  | 6         |
| <b>DATA INTEGRATION PROCESS .....</b>   | <b>6</b>  |
| <b>DATA VALIDATION AND VERIFICATION .....</b>   | <b>10</b> |
| BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION .....                                 | 10        |
| PEER REVIEW .....   | 11        |
| INDUSTRY KNOWLEDGE – SUBJECT MATTER EXPERTS .....   | 11        |
| PUBLIC VERIFICATION/CROWD SOURCING .....  | 11        |
| CURRENCY OF OVERALL PROCESS .....   | 11        |
| SOURCING QC GEOMETRY AND ATTRIBUTION .....  | 12        |
| INTERNAL QC SCRIPTS .....   | 12        |
| NTIA SUBMISSION CHECK .....   | 12        |
| CONFIDENCE VALUES .....   | 12        |
| <b>QUALITY CONTROL .....</b>  | <b>13</b> |
| <b>DETAILED PROCESS REVIEW .....</b>  | <b>13</b> |



**BROADMAP**  
Beyond The Boundaries

## OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1<sup>st</sup>, 2014 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

## SUBMISSION SUMMARY

### PROVIDER DETAILS

#### PROVIDER PARTICIPATION

##### Provider Participation Statistics Summary

| Summary  | Count |
|--|-------|
| Total Valid Broadband Providers                            | 10    |
| Business-only/New Researching Providers                    | 0     |
| Non-Responsive Providers                                   | 5     |
| Non-Cooperative Providers                                  | 2     |
| Number of Providers – Represented in Data Submission       | 10    |
| Number of Providers - Supplied Updates for this Submission | 3     |
| Number of Providers - Confirmed No Updates                 | 0     |

##### New Providers since Last Data Submission

- There are no new providers since the last update

##### Non-Cooperative Providers (Initial Response)

1. Choice Communications
2. Level 3 Communications

##### Providers Included Data This Round

1. AT&T Mobility
2. Innovative PowerNet (VI PowerNet)
3. Sprint

##### Non-Responsive Providers

1. ADM Wireless
2. Broadband VI, LLC
3. HughesNet
4. SmartNet
5. Starband Communications (SpaceNet)



**BROADMAP**  
Beyond The Boundaries

## **COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS**

### **OVERALL STATISTICS**

| Community Anchor Institution - Categories | Overall Count | CAIID Counts | Transmission Technology | Advertised Speed Down | Advertised Speed Up |
|---|---------------|--------------|-------------------------|-----------------------|---------------------|
| Category 1 - School K through 12          | 70            | 32           | 29                      | 70                    | 70                  |
| Category 2 - Library                      | 7             | 5            | 0                       | 7                     | 7                   |
| Category 3 - Medical/Healthcare           | 19            | 0            | 1                       | 19                    | 19                  |
| Category 4 - Public Safety                | 42            | 0            | 3                       | 42                    | 42                  |
| Category 5 - Universities/Colleges        | 2             | 1            | 2                       | 2                     | 2                   |
| Category 6 - Other: Government            | 157           | 2            | 20                      | 157                   | 157                 |
| Category 7 - Other: Non-Government        | 19            | 0            | 0                       | 19                    | 19                  |
| <b>Total</b>                              | <b>316</b>    | <b>40</b>    | <b>55</b>               | <b>316</b>            | <b>316</b>          |

## **HIGH-LEVEL SUMMARY**

### **DATA GATHERING**

#### **BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW**

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

Build and maintain an inventory of Broadband providers through currently known providers and research.

The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



**BROADMAP**  
Beyond The Boundaries

| Company Information              |                                     | Edit                           | Clone   | History | AAD   |          |
|----------------------------------|-------------------------------------|--------------------------------|---|---------|-------|----------|
| Provider Name                    | acmetech (All)                      | Source Name                    | acmetech  |         |       |          |
| Company Address                  |                                     | Source Description             |   |         |       |          |
| Company PO Box                   |                                     | Layer Name                     | TBD   |         |       |          |
| Company House Number             | 12345                               | Source Usage Type              | Tracking  |         |       |          |
| Company Street Name              | Acme Avenue                         | Source Provider Type           | BroadMap  |         |       |          |
| Company City Name                | Portland                            | Source Content Type            |   |         |       |          |
| Company Suite                    |                                     | Source Restrictions            | <input type="checkbox"/>  |         |       |          |
| Company Postal Boundary          |                                     | Source Restriction Description |   |         |       |          |
| Company State                    |                                     | TT Types                       | --None--<br>Asymmetric xDSL<br>Symmetric xDSL<br>Other Copper Wireline<br>Cable Modem-DOCSIS 3.0<br>Cable Modem-Other<br>Optical Carrier/Fiber to the End User<br>Satellite |         |       |          |
| Company Website                  | http://www.acmebroadband.com        |                                |   |         |       |          |
| Source ID                        | 4999                                |                                |   |         |       |          |
| Child Source                     | <input type="checkbox"/>            |                                |   |         |       |          |
| Parent URL                       |                                     |                                |   |         |       |          |
| Parent Source ID                 | 0                                   |                                |   |         |       |          |
| User Name                        |                                     |                                |   |         |       |          |
| Password                         |                                     | Addr Level Data Provided       | <input type="checkbox"/>  |         |       |          |
| Form 477 Interest                | <input type="checkbox"/>            | Preferred Contact Method       |   |         |       |          |
| Provider Portal Trained          | <input checked="" type="checkbox"/> |                                |   |         |       |          |
| <b>Contacts</b> <span>New</span> |                                     |                                |   |         |       |          |
| Type                             | Name                                | Preferred                      | Phone 1   | Phone 2 | Email | Position |
| P                                | Sourcing                            |                                |   |         |       |          |
| <b>FRN Info</b>                  |                                     |                                |   |         |       |          |
| Provider Name                    | DBA                                 | FRN Number                     |   |         |       |          |

| Confidence   |            |               |         | New |
|--|------------|---------------|---------|-----|
| TT Type  | Confidence | Last Modified | Comment |     |
| <b>Status Tracking</b>                                 |            |               |         |     |
| Non Facilities Based Provider <input type="checkbox"/> |            |               |         |     |
| Business Only Provider <input type="checkbox"/>        |            |               |         |     |
| Reseller <input type="checkbox"/>                      |            |               |         |     |
| NDA Review - Internal <input type="checkbox"/>         |            |               |         |     |
| NDA Review - External <input type="checkbox"/>         |            |               |         |     |
| Non Responsive Provider <input type="checkbox"/>       |            |               |         |     |
| Non Cooperative Provider <input type="checkbox"/>      |            |               |         |     |
| Source Closed <input type="checkbox"/>                 |            |               |         |     |
| <b>Service Provider Details</b>                        |            |               |         |     |
| BroadMapper --None--                                   |            |               |         |     |
| Initial State Outreach Date                            |            |               |         |     |
| Provider Origin  |            |               |         |     |
| BroadMap Status Unassigned                             |            |               |         |     |
| Initial Contact Vehicle                                |            |               |         |     |
| Member Association                                     |            |               |         |     |
| Initial State Outreach <input type="checkbox"/>        |            |               |         |     |
| NDA Status --None--                                    |            |               |         |     |
| NDA Not Required <input type="checkbox"/>              |            |               |         |     |
| NDA Requested <input type="checkbox"/>                 |            |               |         |     |
| NDA Exchanged <input type="checkbox"/>                 |            |               |         |     |
| NDA Exchange Date                                      |            |               |         |     |
| NDA Signed <input type="checkbox"/>                    |            |               |         |     |
| NDA Signed Date  |            |               |         |     |
| Date Loaded  |            |               |         |     |
| Source Closed Date                                     |            |               |         |     |

| BDIA Delivery 0412     |                              | Edit  |
|------------------------|------------------------------|---|
| Status                 | --None--                     | Provider Data Reviewed <input type="checkbox"/> |
| Outreach Date          |                              | Provider Data Reviewed Date                     |
| Initial Response       |                              | FootPrint                                       |
| Meeting Date           |                              | MiddleMile                                      |
| No Update Date         |                              | Subscriber                                      |
| Waiting For Data Date  |                              | Provider Login <input type="checkbox"/>         |
| Data Received Date     |                              | Provider Login Date                             |
| Data Accepted Date     |                              |   |
| Source Ingested        |                              | Source Ingested Date                            |
| <b>Additional Data</b> |                              |   |
| Notes                  |                              |   |
| Next Steps             |                              |   |
| Inactive               | <input type="checkbox"/>     | Owner briordan                                  |
| Created By             | briordan 2011-06-13 12:06:35 | Last Modified By krousseau 2012-03-16 13:41:58  |



**BROADMAP**  
Beyond The Boundaries

Update provider material that describes the data requirements and logistics for data transfer.

Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.

Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.

Conduct one-on-one informational discussions with each provider to communicate the following:

- Requirements of this project;
- Broadband data required to support the product data model;
- Submission protocols available;
- Capability to validate how the supplied data is aggregated.

Download/receive provider data.

Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

### **COMMUNITY ANCHOR INSTITUTION (CAI)**

The collection of CAI information is handled through the following CAI Collection Process:

Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.

Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.

Upload web-based data to Core Database for standardization.

Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.

Geocode CAI locations.

Translate Core Database data to deliverable-ready format.

Continue engagement with non-responsive institutions.

### **DATA INTEGRATION PROCESS**

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.

Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.

Categorize input into data-type category (addresses, block lists, paper maps, etc.).

Standardize input based on data type within Staging Database.

Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).

Apply broadband attribution to CP; apply metadata to CP.

Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.

Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.

- Process coverage area to build the required NTIA data model layers.



**BROADMAP**  
Beyond The Boundaries

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

Login

Username

Password

Login

Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy

Contact and Provider Information

Please enter contact information and change provider information if incorrect:

Contact name:

Contact E-mail:

Contact Phone:

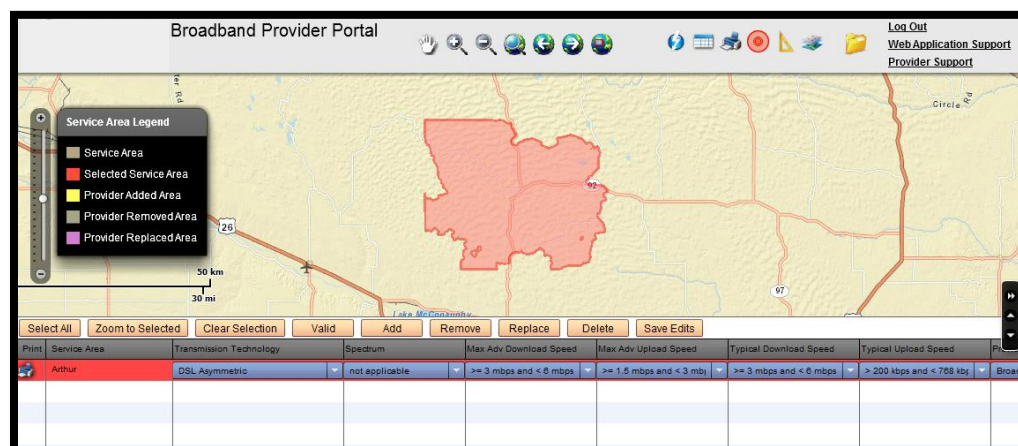
Doing Business As (DBA) Name:

FCC Registration Number (FRN):

Please note the following:

- Contact info will only be stored when a record is saved
- Provider info will be applied to all service areas

Capability to review and request changes to the coverage footprint







The screenshot displays the Broadband Provider Portal interface. At the top, there is a header with the title "Broadband Provider Portal" and navigation links for "Log Out", "Web Application Support", and "Provider Support". Below the header is a map of Arthur, NSW, with a legend indicating different service areas: Service Area (brown), Selected Service Area (red), Provider Added Area (yellow), Provider Removed Area (grey), and Provider Replaced Area (pink). A red line on the map indicates the "Provider removed on Mon Mar 19 15:03:35". Below the map is a toolbar with buttons for "Select All", "Zoom to Selected", "Clear Selection", "Valid", "Add", "Remove", "Replace", "Delete", and "Save Edits". At the bottom, there is a table with columns for "Print", "Service Area", "Transmission Technology", "Spectrum", "Max Adv Download Speed", "Max Adv Upload Speed", "Typical Download Speed", "Typical Upload Speed", and "Provider Type". The table contains two rows of data, both for the "Arthur" service area, showing "DSL Asymmetric" technology and various speed ranges.

| Print | Service Area                            | Transmission Technology | Spectrum       | Max Adv Download Speed | Max Adv Upload Speed     | Typical Download Speed | Typical Upload Speed      | Provider Type |
|-------|---|-------------------------|----------------|------------------------|--------------------------|------------------------|---------------------------|---------------|
|       | Provider removed on Mon Mar 19 15:03:35 | Other                   | not applicable | Unknown                | Unknown                  | Unknown                | Unknown                   | Broadband     |
|       | Arthur                                  | DSL Asymmetric          | not applicable | >= 3 mbps and < 6 mbps | >= 1.5 mbps and < 3 mbps | >= 3 mbps and < 6 mbps | > 200 kbps and < 768 kbps | Broadband     |

**Broadband Provider Portal**

Status: Click to select pushpin

**Service Area Legend**

- Service Area
- Selected Service Area
- Provider Added Area
- Provider Removed Area
- Provider Replaced Area

**Middle-Mile Information Editor**

Ownership: Owned  
 Back-haul Capacity: Greater than or equal to 2  
 Back-haul Type: Fiber  
 Elevation (feet): -9999  
 State Location: NE  
 Location Valid: Unknown

**Display Information**

Display Middle-Mile information by hovering over the Middle-Mile location with the cursor.

**Edit Information**

Edit Middle-Mile information by clicking on the Middle-Mile location.

**Validate Information**

Validate All Middle-Mile Locations

Add Middle-Mile location on map:  
 Select Find Address' or Pushpin Location'

☐ FindAddress ☐ Pushpin Location

| Print | Service Area | Transmission Technology | Spectrum       | Max Adsl Download Speed | Max Adsl Upload Speed    | Typical Download Speed |
|-------|--------------|-------------------------|----------------|-------------------------|--------------------------|------------------------|
|       | Arlow        | DSL Asymmetric          | not applicable | >= 3 mbps and < 6 mbps  | >= 1.5 mbps and < 3 mbps | >= 3 mbps and < 6 mbps |

AWNS

### AWNS Settings for 'DSL Symmetric' in Arthur County

Change the advertised download speeds and/or change the number of subscribers and click 'Calculate AWNS'

|                              |                                |                   |                                |
|------------------------------|--------------------------------|-------------------|--------------------------------|
| Advertised Download kbps #1: | <input type="text" value="0"/> | # of Subscribers: | <input type="text" value="0"/> |
| Advertised Download kbps #2: | <input type="text" value="0"/> | # of Subscribers: | <input type="text" value="0"/> |
| Advertised Download kbps #3: | <input type="text" value="0"/> | # of Subscribers: | <input type="text" value="0"/> |
| Advertised Download kbps #4: | <input type="text" value="0"/> | # of Subscribers: | <input type="text" value="0"/> |
| Advertised Download kbps #5: | <input type="text" value="0"/> | # of Subscribers: | <input type="text" value="0"/> |

AWNS in kbps:

Calculate AWNS

Save AWNS

Cancel






**BROADMAP**  
Beyond The Boundaries

File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round





Welcome

1

Choose a file to upload:

Browse...

Upload File

(50MB max)

\*Uploading a new file with the same name as an existing file will overwrite the existing file

Uploaded Files

2

Please click here to auto-notify BroadMap of your uploads, thanks.

3

Logout

Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.



**BROADMAP**  
Beyond The Boundaries

## DATA VALIDATION AND VERIFICATION

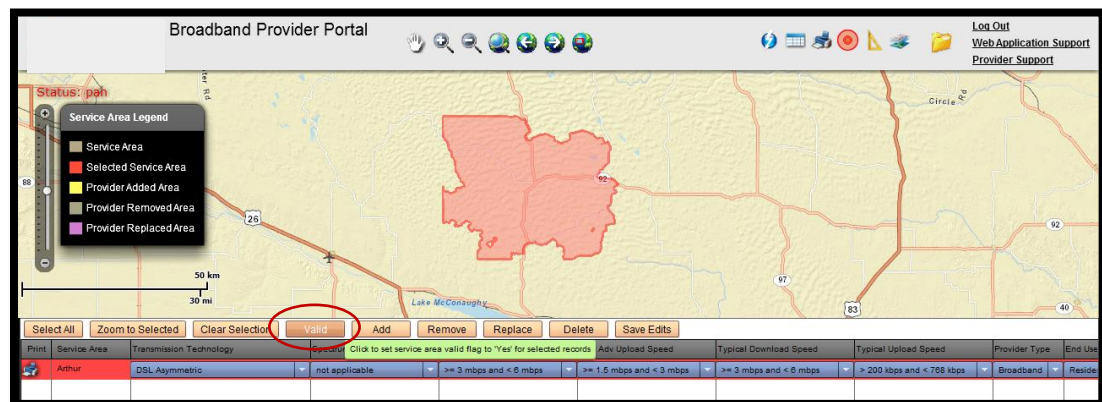
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action.

### BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the [Data Integration Process](#) and are reviewed with the provider to complete validation.

With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

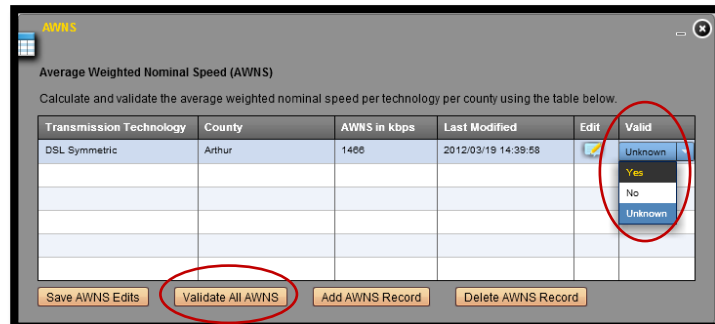
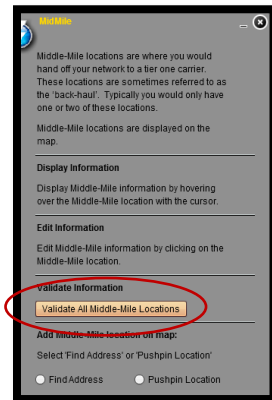
Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.





**BROADMAP**  
Beyond The Boundaries

## Middle Mile & AWNS Validation



All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

### PEER REVIEW

The BroadMap Team takes the time to sit down together and visually inspect the data for any abnormalities that need to be discussed.

### INDUSTRY KNOWLEDGE – SUBJECT MATTER EXPERTS

Relationships and partnerships often already exist between the US Virgin Islands and the broadband providers, giving a first-hand look at the services offered and where they are offered. In addition, the USVI broadband team has ready access to industry experts within the fields of telecommunications and data networking. Any anomalies or questioned material is relayed to the providers for review.

### PUBLIC VERIFICATION/CROWD SOURCING

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

<https://usvi.broadmap.com/PublicMap/>

### CURRENCY OF OVERALL PROCESS

This is a review of providers who sent updated coverage area data to BroadMap, or were at least cooperative, reporting no updates or changes for this round of submission.



**BROADMAP**  
Beyond The Boundaries

## ***SOURCING QC GEOMETRY AND ATTRIBUTION***

This is a review that providers whose coverage areas submitted through the portal or via shapefile, met standards for the following:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

## ***INTERNAL QC SCRIPTS***

Internal QC scripts were run to check that data input into the attribution of the coverage areas matched the data in the internal Provider Catalog. This included attributes such as FRN number, source id # and Provider Name.

## ***NTIA SUBMISSION CHECK***

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD\_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

## ***CONFIDENCE VALUES***

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a Validation spreadsheet. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

The confidence value is calculated from the provider meeting the Quality Control checks listed below (and outlined in detail above):

- Provider Validation
- Peer Review
- State Review / Subject Matter Expert Review
- Crowd Sourcing
- Currency of Overall Process
- Sourcing QC Geometry and Attribution
- Internal QC Scripts
- NTIA Submission Check

With the continued efforts on provider validation, 3<sup>rd</sup> party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention.



**BROADMAP**<sup>SM</sup>  
Beyond The Boundaries

## **QUALITY CONTROL**

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. These items are outlined above in the [Sourcing QC Geometry and Attribution](#) and [Internal QC Scripts](#) and [NTIA Submission Check](#) under [Data Validation and Verification](#).

## **DETAILED PROCESS REVIEW**

To review the detailed process, please review the document BMap\_ProcessDetails\_2014\_10\_01.pdf included with this submission.