



## **Broadband Data Collection**

### **Data Specifications for Biannual Submission of Subscription, Availability, and Supporting Data**

**March 4, 2022**

## Table of Contents

1	Overview.....	1
2	Scope of Filers .....	2
2.1	Service Providers .....	2
2.2	Government and Third-Party Entities .....	3
3	Entity Information .....	5
4	Fixed and Mobile Form 477 Subscription Data .....	10
4.1	Fixed Broadband Subscription Data (Tract-level Data) .....	10
4.2	Fixed Voice Subscription Data (Tract-level) .....	13
4.3	Mobile Broadband Subscription Data .....	14
4.4	Mobile Voice Subscription Data .....	15
5	Fixed Broadband Availability Data .....	17
5.1	Fixed Broadband Availability Location Lists .....	19
5.2	Fixed Broadband Availability Coverage Maps .....	23
6	Fixed Broadband Supporting Data .....	26
6.1	Fixed Broadband Coverage Methodology Information .....	28
6.2	Verified Fixed Availability Data Information .....	28
6.3	Fixed Wireless Propagation Modeling Information .....	29
6.3.1	Fixed Wireless Propagation Model Details .....	29
6.3.2	Fixed Wireless Propagation Model Conditions Explanation.....	31
6.4	Fixed Wireless Base Station Location and Height .....	31
6.5	Fixed Wireless Base Station Carriers .....	32
6.6	Fixed Wireless Link Budget Parameters .....	34
6.7	Fixed Wireless Clutter Category Data.....	41
7	Mobile Broadband and Mobile Voice Availability Data .....	43
7.1	Mobile Broadband Availability Coverage Maps .....	43
7.2	Mobile Voice Availability Coverage Maps .....	45
8	Mobile Broadband Supporting Data .....	47
8.1	Mobile Propagation Modeling Information .....	48
8.1.1	Mobile Propagation Model Details.....	48
8.1.2	Mobile Propagation Model Conditions Explanation.....	50
8.2	Mobile Link Budget Parameters.....	51
8.3	Mobile Clutter Category Data .....	62

8.4	Mobile Propagation Model and Link Budget Association .....	63
8.5	Mobile Link Budget Parameters Rationale .....	63
8.6	Mobile Link Budget Description .....	65
8.7	Verified Mobile Broadband Availability Data Information .....	65

## 1 Overview

The data specifications set forth herein detail the data required in the sections of the Federal Communications Commission's (FCC) web-based Broadband Data Collection (BDC) system. This document:

- Specifies whether data should be submitted in the BDC system via file upload and/or using web form
- Identifies the acceptable format(s) for data files that must be uploaded
- Specifies how data files should be formatted, which fields they should contain, and the data type of each field (such as text, integer, or decimal)
- Provides examples of data entries
- Explains what, if any, constraints are placed on the data, such as whether a number must be within a particular range of values.

The requirements in this document do not constitute binding FCC rules; rather, this document provides guidance on the requirements that govern the binding FCC data collection rules and explains how to make the required filings in the system. The rules governing the FCC's Broadband Data Collection (formerly known as the Digital Opportunity Data Collection) and Form 477 can be found at 47 CFR §§ 1.7001 - 1.7010.

In addition to submitting data in the BDC system via file upload and/or web form, filers of biannual submissions may also submit data using an Application Programming Interface (API). Instructions on how to use the API will be provided at a later date.

The FCC's Office of Economics and Analytics may publish updates to this document before the initial BDC filing window and subsequent BDC filing windows. Instructions for biannual BDC submissions, a User Guide to the BDC system, and other materials will be made available on the Broadband Data Collection page of the FCC's website at <https://www.fcc.gov/BroadbandData/filers> before the initial BDC filing window.

## 2 Scope of Filers

### 2.1 Service Providers

All facilities-based providers of fixed and mobile broadband internet access service (as defined in 47 CFR § 1.7001) *must* submit a biannual Broadband Data Collection filing. Each BDC filing must include entity information, BDC broadband availability data, BDC supporting data, and Form 477 broadband subscription data. The BDC system includes modules for collecting Form 477 subscription data under the existing rules for that collection.

To the extent such fixed and mobile broadband internet access service providers are also providers of local telephone service, facilities-based providers of mobile telephony service, or providers of interconnected voice over internet protocol (VoIP) service (descriptions and definitions of each provider type can be found at <https://us-fcc.app.box.com/v/WhoMustFileForm477>), they also must file their Form 477 fixed and/or mobile voice subscription data, as well as any BDC mobile voice availability data, in the BDC system.

#### ***Overlapping BDC and Form 477 Collections.***

Form 477 filers must continue to submit data in the Form 477 filing interface, under the rules for that collection, for the as-of June 30, 2022 filing round and until the FCC sunsets the collection of Form 477 deployment data.

Therefore, Form 477 filers that submit fixed broadband deployment and subscription data, mobile broadband deployment and subscription data, and mobile voice deployment and subscription data in Form 477 must submit data as of June 30, 2022 in two systems: the Form 477 filing interface and the BDC system. The subscription data submitted in both systems is nearly identical (see Section 4 below), while the availability data that must be submitted in the BDC system differs significantly from the deployment data submitted in the Form 477 filing interface. More information on the data submission requirements of the Form 477 interface can be found at [www.fcc.gov/form477](http://www.fcc.gov/form477).

#### ***Fixed Voice-Only Providers.***

Service providers of fixed voice service that do not also offer broadband internet access service *may* file their Form 477 fixed voice subscription data as of June 30, 2022 in the BDC system but are not required to do so. Once the Form 477 filing system is decommissioned, the sole platform for collecting all Form 477 subscription data will be the BDC system; at that time, fixed voice-only providers will be required to submit their Form 477 fixed voice subscription data in the BDC system.

The following table provides an overview of the sections of a BDC/Form 477 filing that each type of provider must complete.

## BDC Filing Sections by Type of Provider

Section	<i>Facilities-based Providers of Fixed Broadband Service</i>	<i>Facilities- based Providers of Terrestrial Mobile Wireless Broadband</i>	<i>Providers of Wired or Fixed Wireless Local Exchange Telephone Service*</i>	<i>Providers of Interconnected VoIP Service*</i>	<i>Facilities- based Providers of Mobile Voice Service</i>
Entity Identification	✓	✓	✓	✓	✓
<b>Fixed Services</b>					
Fixed Broadband Availability	✓				
Fixed Broadband Availability Supporting Data	✓				
Fixed Broadband Subscription	✓				
Fixed Voice Subscription (Tract Data)			✓	✓	
Local Exchange Telephone Subscriptions (State Data)			✓		
Interconnected VoIP Subscriptions (State Data)				✓	
<b>Mobile Services</b>					
Mobile Broadband Availability		✓			
Mobile Broadband Availability Supporting Data		✓			
Mobile Broadband Subscription		✓			
Mobile Voice Availability					✓
Mobile Voice Subscription					✓

*\*Filing in the BDC system is optional for these types of providers for the June 30, 2022 filing round and until the Form 477 filing interface is decommissioned.*

Service providers must submit and certify the data submitted in their biannual BDC filings. They also must revise and re-submit prior filings to correct any errors, whether identified by themselves, FCC staff, in response to challenges, or in response to a verification inquiry.

### 2.2 Government and Third-Party Entities

Governmental and third-party entities that fulfill the criteria described herein *may* voluntarily submit verified broadband availability data in the BDC system as part of the biannual Broadband Data Collection. Government entities that may file BDC availability data include state, local, and Tribal governmental entities that are primarily responsible for mapping or tracking broadband internet access service coverage in their relevant jurisdiction, as well as other federal agencies. These entities may submit verified data on the broadband services

made available by a service provider, or a set of providers, as part of the biannual BDC availability data collection. Government entities that offer broadband service should file BDC data as a service provider, and not as a government entity.

In addition, third-party entities may submit verified data on the availability of broadband services offered by service providers. Any entity submitting data *on behalf of* a particular service provider, such as a consulting firm, should submit data as the service provider, rather than as a third party. The FCC may use data submitted from third-party entities in the development of the coverage maps, or in verifying data submitted by service providers, if the FCC decides that doing so is in the public interest.

The Commission will review the source(s) of the data submitted by each governmental and third-party entity, and the steps taken to gather and verify such data. In particular, the Commission will review whether the entity that submitted the data specializes in gathering and/or analyzing broadband availability data; and whether the entity (or the entity acting on its behalf) employed a sound and reliable methodology in collecting, organizing, and verifying the submitted data. Governmental and third-party entities may not submit data collected directly from service providers without first attempting to verify the data.

Availability data submitted by governmental and third-party entities must be in substantially the same format, and must include the same information and details, as the coverage data submitted by service providers. Therefore, the availability data submitted by governmental and third-party entities must conform to the specifications provided below. Their data must be filed in the BDC system during the same filing window, and using the same as-of date, as the data filed by service providers.

### 3 Entity Information

Any individual submitting information in the BDC system, either on behalf of a service provider or as a governmental or third-party entity, must submit the following information about themselves and the entity for which they are submitting data. This information must be entered in a web form in the BDC system. All values are required unless otherwise noted.

Any entity submitting information on behalf of a service provider, such as a consulting firm, should submit the relevant information about the service provider, as specified in the table below.

Field	Entity Type			Example	Description / Notes
	Service Provider	Government	Third Party		
<b>Entity Type</b>	✓	✓	✓	Service Provider	The type of entity that the filer is, whether Service Provider, Government, or Other. Third-party entities submitting verified availability data should select "Other."
<b>Government Entity Type</b>		✓		Tribal	If the entity is a government entity, the type of government entity that the filer is, whether State, Local, Tribal, or Federal.
<b>ILEC Status</b>	✓			Yes	This entity is / is not affiliated with an ILEC and the filing will / will not incorporate ILEC data.
<b>Brand Names</b>	✓			Tom's Broadband	The brand name(s) and / or doing-business-as name(s) associated with the entity
<b>Holding Company/ Common Control Name</b>	✓			Tom's Broadband Holdings, Inc.	The parent company name or other name used to associate all commonly owned or commonly controlled entities
<b>Website URL</b>	✓	✓	✓	<a href="http://www.tombbh.url">www.tombbh.url</a>	The URL of the entity's website <i>This field is required unless entity indicates on the form that it does not have a website.</i>
<b>Study Area Codes</b>	✓			999999	The 6-digit study area code for each Eligible Telecommunications Carrier's designated service areas that overlap the geographic area of this entity's availability or subscribership data



Field	Entity Type			Example	Description / Notes
	Service Provider	Government	Third Party		
<b>Form 499 Filer IDs</b>	✓			877777	The 6-digit Form 499 Filer ID(s) for the telecommunications providers entirely or partially included as part of this entity's fixed and / or mobile data submissions
<b>Data Submission Type Request</b>		✓	✓		An indication of whether the government or other third-party entity is requesting access to the BDC to submit Broadband Availability Data and/or Bulk Crowdsourced / Challenge Data.
<b>Data Contact Name</b>	✓	✓	✓	Joe Broadband	Name of the person who can best answer questions from FCC staff about the filer's data
<b>Data Contact Title</b>	✓	✓	✓	Comptroller	Title of the designated Data Contact. The Data Contact is the person who can best answer questions from FCC staff about the filer's data
<b>Data Contact Email</b>	✓	✓	✓	joe.broadband@tombbh.com	Email address of the designated Data Contact. The Data Contact is the person who can best answer questions from FCC staff about the filer's data
<b>Data Contact Phone</b>	✓	✓	✓	888-555-6500	10-digit phone number of the designated Data Contact. The Data Contact is the person who can best answer questions from FCC staff about the filer's data
<b>Data Contact Extension</b>	✓	✓	✓	2345	Phone extension of the designated Data Contact. The Data Contact is the person who can best answer questions from FCC staff about the filer's data. <i>This field is optional.</i>
<b>Emergency Operations Contact Name</b>	✓			Jane Broadband	Name of the person who can be contacted for information on network status during natural disasters or other emergencies
<b>Emergency Operations Contact Title</b>	✓			NOC Contact	Title of the designated Emergency Operations Contact

Field	Entity Type			Example	Description / Notes
	Service Provider	Government	Third Party		
Emergency Operations Contact Email	✓			jane.broadband@tombbh.com	Email address of the designated Emergency Operations Contact
Emergency Operations Contact Phone	✓			888-555-6500	10-digit phone number of the designated Emergency Operations Contact
Emergency Operations Contact Extension	✓			2346	Phone extension of the designated Emergency Operations Contact <i>This field is optional.</i>
Certifying Engineer Name	✓	✓	✓	Sam Broadband	Name of the certified professional engineer or corporate engineering officer who has direct knowledge of, or responsibility for, the generation of the availability data (including supporting data). This individual must certify that he/she has examined the information in the submission for accuracy and that the information is in accordance with the entity's ordinary course of network design and engineering.  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>
Certifying Engineer Title	✓	✓	✓	Principal Engineer	Title of the Certifying Engineer  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>
Certifying Engineer Email	✓	✓	✓	Sam.broadband@tombbh.com	Email address of the Certifying Engineer  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>

Field	Entity Type			Example	Description / Notes
	Service Provider	Government	Third Party		
<b>Certifying Engineer Phone</b>	✓	✓	✓	888-555-6500	10-digit phone number of the Certifying Engineer  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>
<b>Certifying Engineer Extension</b>	✓	✓	✓	2346	Phone extension of the Certifying Engineer  <i>This field is optional.</i>
<b>Certifying Official Name</b>	✓	✓	✓	Bridget Broadband	Name of the company officer of the entity certifying the submitted information
<b>Certifying Official Title</b>	✓	✓	✓	Vice President	Title of the Certifying Official
<b>Certifying Official Email</b>	✓	✓	✓	bridget.broadband@tombbh.com	Email address of the Certifying Official
<b>Certifying Official Phone</b>	✓	✓	✓	888-555-6500	10-digit phone number of the Certifying Official
<b>Certifying Official Extension</b>	✓	✓	✓	0002	Phone extension of the Certifying Official  <i>This field is optional.</i>
<b>Certifying Official Mailing Address</b>	✓	✓	✓	123 Main Street Unit 101 Springfield, VA 12345	Five fields for the mailing address of the Certifying Official (if domestic): Address Line 1 Address Line 2 (optional) City State / Territory (from dropdown) ZIP Code ZIP+4 (optional)  Three fields for the mailing address of the Certifying Official (if international): Street Address City or Town, Other Principal Subdivision, and Postal Code Country

Field	Entity Type			Example	Description / Notes
	Service Provider	Government	Third Party		
<b>Government Entity Responsibility Certification</b>		✓			A certification that a State or Local government entity filer has primary responsibility for tracking broadband data in the area of its jurisdiction.  <i>This field is only required of State or Local government entities that request access to submit Broadband Availability Data.</i>
<b>Entity Specialization Certification</b>		✓	✓		A certification that a government or other third-party entity filer specializes in gathering and/or analyzing broadband availability data.  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>
<b>Description of Entity's Role in Broadband Mapping</b>		✓	✓		An explanation of a government or other third-party entity's role in and responsibility for mapping or measuring broadband.  <i>This field is only required of government or other third-party entities that request access to submit Broadband Availability Data.</i>

#### ***A Word about Header Rows:***

When uploading files in the BDC system, users must include the header row specified for each file, and its characters must match what is specified in this document. The exception to this is file uploads of subscription data, where filers can either a) include the header specified below for each upload file, or b) remove the header row from the file. File templates that include the specified header rows will be made available for download from the FCC's website.

#### ***A Word about Required Fields:***

In the file specifications below, all of the fields are required. In certain specified cases, the value for a field can be left null. However, the field (or column) must still be included in the file; if it is not, the user will receive an error message from the BDC system.

## 4 Fixed and Mobile Form 477 Subscription Data

Providers of broadband internet access service should file Form 477 broadband and voice subscription data – traditionally collected in the FCC’s Form 477 filing interface – in both the new BDC system and the existing Form 477 filing interface until further notice. The BDC system will run automated data quality checks that compare the Form 477 subscribership data with the BDC availability data and track whether the same provider is complying with both the Form 477 and BDC collections.

As noted above in Section 2, providers of fixed voice service that do not offer broadband internet access service must file fixed voice subscription data in the Form 477 filing interface until notice. Such providers have the option to also file their fixed voice subscription data in the BDC system.

The table below summarizes the fixed and mobile subscribership data and how the data should be submitted in the BDC system. Additional detail on each data item follows.

Section	Data Item	Entities Who File	Method of Submission	Description / Notes
4.1	Fixed Broadband Subscriptions	Fixed Broadband Service Providers	File Upload or Web Form	A count of subscriptions to the fixed service provider’s broadband service offerings by census tract.
4.2	Fixed Voice Subscriptions	Fixed Voice Service Providers	Part 1 (tract-level data): File Upload or Web Form Part 2 (state-level data): Web Form	A count of subscriptions to the fixed service provider’s voice service offerings by census tract. After entering the tract-level data, filers must enter state-level breakouts in a web form in the BDC system. These breakouts will group lines and/or subscriptions into different categories.
4.3	Mobile Broadband Subscriptions	Mobile Broadband Service Providers	File Upload or Web Form	A count of subscriptions to the mobile service provider’s broadband service offerings by state.
4.4	Mobile Voice Subscriptions	Mobile Voice Service Providers	Web Form	A count of subscriptions to the mobile service provider’s voice service offerings by state.

### 4.1 Fixed Broadband Subscription Data (Tract-level Data)

Information in this section must be reported by facilities-based providers of fixed broadband service. Filers should report connections to end-user premises -- by census tract, technology code, advertised downstream speed, and advertised upstream speed -- that the service provider (including affiliates) equips to enable an end user to receive information from and/or send information to the internet at information transfer rates exceeding 200 kbps in at least one direction.

This information can be submitted via web form or file upload. The Form 477 subscribership data that filers must submit in the BDC system is nearly identical to the data that must be submitted in the Form 477 filing interface. The only difference is that the list of technology codes for fixed broadband subscription data has been updated for BDC filings to match the list of technology codes associated with the BDC fixed broadband availability data. The fields and formatting requirements are identical to those in the FCC Form 477 filing interface.

File uploads must be submitted in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Rows must be unique by tract, technology, advertised downstream speed, and advertised upstream speed. If a provider has broadband connections in service in a particular census tract via two technologies, then the data should contain two records for that census tract. Similarly, if a provider has connections to two (or more) different levels of service with the same technology in a tract, then the data should contain two (or more) records for that census tract.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Tract Code</b>	tract	Text {11}	11001006202	11-digit 2020 census tract code – must be 11 digits! Filers should also ensure that the tract code is stored as text rather than as a numeric value (otherwise, any leading zeros in the tract code will be dropped).
<b>Technology</b>	technology	Integer	50	Code for the technology used for the deployed service. The value must be one of the following codes:  <i>0 – Other</i> <i>10 – Copper Wire (xDSL, Ethernet over Copper, etc.)</i> <i>40 – Coaxial Cable / HFC (DOCSISx)</i> <i>50 – Optical Carrier / Fiber to the Premises (Fiber to the home or business end user, does not include “fiber to the curb”)</i> <i>60 – Geostationary Satellite</i> <i>61 – Non-geostationary Satellite</i> <i>70 – Unlicensed Terrestrial Fixed Wireless (including fixed service provided over WIFI sold as a fixed solution or another technology using entirely unlicensed spectrum)</i> <i>71 – Licensed Terrestrial Fixed Wireless (including fixed service provided over a 4G LTE or 5G-NR mobile network but sold as a fixed solution, microwave, etc. using entirely licensed spectrum or a hybrid of licensed and unlicensed spectrum)</i>

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Advertised Downstream Speed</b>	advertised_download_speed	Decimal or Integer (depending on value)	100	<p><u>Advertised</u> downstream speed of the service as sold in Mbps. Enter up to 3 places after the decimal (e.g., enter 768 kbps as 0.768).</p> <p>Report speeds greater than 10 Mbps as whole numbers or round to the nearest whole number (e.g., enter 12.25 Mbps as 12 Mbps). If the downstream speed of the service is advertised in a range (that is, an “up to” speed), enter the high end of that range. If no downstream speed is mentioned in marketing, enter the speed the end user should expect to receive. (Note: Report each service option for which there are end-user connections in service.)</p>
<b>Advertised Upstream Speed</b>	advertised_upload_speed	Decimal or Integer (depending on value)	20	<p><u>Advertised</u> upstream speed of the service as sold in Mbps. Enter up to 3 places after the decimal (e.g., enter 768 kbps as 0.768).</p> <p>Report speeds greater than 10 Mbps as whole numbers or round to the nearest whole number (e.g., enter 12.25 Mbps as 12 Mbps). If the upstream speed is advertised in a range (that is, an “up to” speed), enter the high end of that range. If no upstream speed is mentioned in marketing, enter the speed the end user should expect to receive. (Note: Report each service option for which there are end-user connections in service.)</p>
<b>Total Connections</b>	total_connections	Integer	100	Total number of connections in this census tract with this combination of technology code, advertised upstream speed and advertised downstream speed.
<b>Consumer Connections</b>	consumer_connections	Integer	57	Number of connections in this census tract with this combination of technology code, advertised upstream speed and advertised downstream speed provided in consumer-grade service plans. Consider connections to be “consumer” or “residential” when they deliver internet-access services that are primarily purchased by, designed for, and/or marketed to residential end users.

## 4.2 Fixed Voice Subscription Data (Tract-level)

Information in this section is reported by local exchange carriers that have end-user customers and by providers of interconnected VoIP service that have end-user customers.

This information can be submitted via web form or file upload. The content and formats are identical to those in the FCC Form 477 filing interface. File uploads must be submitted in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Rows must be unique by tract and service type.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Tract Code</b>	tract	Text{11}	11001006202	11-digit 2020 census tract code – must be 11 digits! Filers should also ensure that the tract code is stored as text rather than as a numeric value (otherwise, any leading zeros in the tract code will be dropped).
<b>Service Type</b>	service_type	Integer {1}	0	A code indicating the type of service counted in each record: 0=VGE lines (for local exchange services) or 1=VoIP subscriptions (for interconnected VoIP services).  - Value must be one of the following codes:  0 – Voice-grade Equivalent Line 1 – Interconnected Voice over IP (VoIP)
<b>Total VGE lines or VoIP Subscriptions</b>	total_lines_or_subscriptions	Integer	100	The number of voice-grade equivalent lines and voice-grade equivalent wireless channels in service (if Service Type = 0) OR the number of VoIP subscriptions (if Service Type = 1) provided in the census tract.
<b>Consumer VGE Lines or VoIP Subscriptions</b>	consumer_lines_or_subscriptions	Integer	57	The number of voice-grade equivalent lines and voice-grade equivalent wireless channels in service (if Service Type=0), OR the number of VoIP subscriptions (if Service Type=1) provided in consumer-grade service plans in the census tract. A consumer service plan (or Mass market / consumer service plan) is a service plan designed for, marketed to, or purchased by primarily residential end users.



### 4.3 Mobile Broadband Subscription Data

Information in this section must be reported by facilities-based providers of mobile broadband service. Filers should report, by state, minimum downstream speed, and minimum upstream speed, subscriptions that the provider (including its affiliates and mobile virtual network operators (or MVNOs)) equips to enable the end user to receive information from and/or send information to the internet at information transfer rates exceeding 200 kbps in at least one direction.

This information can be submitted via web form or file upload. The content and formats are identical to those in the FCC Form 477 filing interface. File uploads must be submitted in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Records must be unique by state, minimum downstream speed, and minimum upstream speed. For example, if a provider has mobile wireless broadband subscriptions in service in a particular state at two (or more) different minimum downstream speeds, then there should be two (or more) records for that state.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>State</b>	state	Text {2}	01	2-digit FIPS Code for the state. A list can be found on the U.S. Department of Agriculture State FIPS Codes webpage at <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs143_013696">https://www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs143_013696</a> .
<b>Minimum Downstream Speed</b>	min_download_speed	Decimal	35.0	Minimum downstream speed of the service offering in Mbps. If the downstream speed of the service offering is advertised in a range, enter the low end of the range or the minimum speed of the service offering. If no downstream speed is mentioned in marketing, enter the minimum downstream speed subscribers to that service offering should expect to receive. Enter up to 3 digits after the decimal. (For example, 768 kbps would be entered as 0.768.)
<b>Minimum Upstream Speed</b>	min_upload_speed	Decimal	3.0	Minimum upstream speed of the service offering in Mbps. If the upstream speed of the service offering is advertised in a range, enter the low end of the range or the minimum speed of the service offering. If no upstream speed is mentioned in marketing, enter the minimum upstream speed subscribers to that service offering should expect to receive. Enter up to 3 digits after the decimal. (For example, 768 kbps would be entered as 0.768.)

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Total Subscribers</b>	total_subscribers	Integer	100	Subscribers in the state where the device and subscription allow the user to access lawful internet content of the user's choice at information transfer rates exceeding 200 kbps in at least one direction. If an individual account includes multiple connections that meet these criteria, each connection should be counted as a separate subscriber. Do not include connections where the subscriber's content is restricted to only customized-for-mobile content. Include connections with a data plan that allows the user to transfer, on a monthly basis, either a specified or an unlimited amount of data to and from the internet via a mobile network. Such data plans may be purchased as a bundle with a voice subscription, as an add-on to a voice subscription, or for a non-voice mobile device. Include directly-billed subscribers, prepaid subscribers, and subscribers served via resellers.
<b>Total Consumer Subscribers</b>	consumer_subscribers	Integer	57	Of the total number of subscribers, the number that are not billed to a corporate, non-corporate business, government, or institutional customer account. Note that you should enter the number of subscribers rather than a percentage of the total.

#### 4.4 Mobile Voice Subscription Data

Information in this section must be reported by facilities-based providers of mobile voice service. For each state, filers should report subscriptions that the service provider (including its affiliates and MVNOs) equips to enable end users to place and receive calls to and from the public switched telephone network.

This information must be submitted via web form. The content and formats are identical to those in the FCC Form 477 filing interface. All values are required.

Records must be unique by state.

Field	Example	Description / Notes
<b>State</b>	01	2-digit FIPS Code for the state. A list can be found on the U.S. Department of Agriculture State FIPS Codes webpage at <a href="https://www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs143_013696">https://www.nrcs.usda.gov/wps/portal/nrcs/detail/?cid=nrcs143_013696</a> .
<b>Total Subscribers</b>	100	Total subscribers, where a "subscriber" refers to a mobile handset or other revenue-generating active voice unit that has a unique phone number and that can be used to place calls to and receive calls from the public switched telephone network.

Field	Example	Description / Notes
<b>Directly Billed or Prepaid Subscribers</b>	57	The number of mobile voice subscribers in the state that are directly billed or prepaid subscribers of the facilities-based provider.

## 5 Fixed Broadband Availability Data

Facilities-based providers of fixed broadband service must report data on their service availability in one of two formats:

- 1) a list of locations served by the provider, in a tabular format, where the locations are based on the FCC's Broadband Serviceable Location Fabric, or
- 2) a polygon representing the availability of the provider's service in one of the acceptable GIS formats listed below.

Service providers must use one of these formats for all of their fixed availability data in each BDC filing. They may not submit some fixed availability data in one format and some in the other format.

Governmental or third-party entities may voluntarily submit "verified" data on the coverage of particular fixed broadband providers. Such data must be submitted in one of the formats listed above. Filers must use one of the formats for all of their fixed availability data. They may not submit some fixed availability data in one format and some in the other format.

Regardless of the format chosen, providers of fixed broadband service must base their service availability footprints on the definitions and standards specified in the Broadband DATA Act and adopted by the FCC. Specifically, providers reporting fixed service must identify the locations in areas where they have actually built out their broadband network infrastructure and to which they either currently provide service or could perform a standard broadband installation. A standard installation is defined in the Broadband DATA Act as "[t]he initiation by a provider of fixed broadband internet access service [within 10 business days of a request] in an area in which the provider has not previously offered that service, with no charges or delays attributable to the extension of the network of the provider."

***Fixed Wired Reporting.*** Providers of fixed wired broadband service must not exceed specific *maximum* buffer distances around their aggregation points when reporting service availability based on their wired technologies. Buffer distances from the aggregation point to the served location are measured in route distance and therefore must reflect where providers have deployed their last-mile distribution networks. Providers may not create and submit a coverage area based on an aerial (or "as the crow flies") radius around an aggregation point. Below is a summary of the maximum buffer sizes:

- For providers using Digital Subscriber Line (DSL) technologies to offer speeds at 25/3 Mbps or greater, the maximum buffer is a distance of 6,600 route feet from the DSLAM (DSL Access Multiplexer) to the covered premises.
  - Providers that make fixed DSL service available at a maximum speed less than 25/3 Mbps in an area will not be subject to a maximum buffer requirement for such areas. However, these coverage areas must include only the areas where the provider has actually built out their broadband network infrastructure, such that they are able to provide service or could perform a standard broadband installation.

- For providers using Hybrid-Fiber Coax (HFC or cable) technology, the maximum buffer is 12,000 route feet from the aggregation point to the customer premises.
- For providers using Fiber to the Premises (FTTP or fiber) technologies, the maximum buffer is 196,000 route feet from the Optical Line Terminal (OLT) to the Optical Network Termination (ONT).
- For all fixed wired technologies, the buffer distance from the aggregation point shall include the drop distance. The drop distance is a maximum of 500 feet from a deployed line or distribution network infrastructure to the parcel boundary of a served location.

These buffers are not safe harbors or substitutes for a provider’s own determination of the extent of the actual availability of its service. Instead, the buffers are *maximum* distances that wireline broadband service providers may not exceed in filing their availability data except where a specific exception applies. In their availability reporting, filers should only include locations outside of the prescribed buffers under the following circumstances:

- the filer has served a current or former subscriber using speed and technology;
- the locations are in an area in which the provider is receiving or has received universal service support to provide broadband service—or has other federal, state, or local obligations to make service available in the area—and the provider has begun to make service available in that area; or
- the Commission has granted a waiver to exceed the buffers based on a specific showing by the provider.

**Terrestrial Fixed Wireless Reporting.** Fixed wireless providers that submit availability information in a coverage polygon format must base their coverage on propagation modeling. Fixed wireless providers must use the following parameters in their propagation modeling when generating their coverage for BDC:

- A minimum 75% cell edge probability;
- A minimum 50% cell loading factor; and
- Receiver heights within a range of four to seven meters.

Section	Data Item	Entities	Method of Submission	Description / Notes
5.1	Fixed Broadband Coverage (Location List)	Fixed Service Providers Governmental Entities Third Parties	File Upload	A list of locations (coded from the Broadband Serviceable Location Fabric) indicating the extent of a fixed service provider’s broadband service area in tabular format.

Section	Data Item	Entities	Method of Submission	Description / Notes
5.2	Fixed Broadband Coverage (Polygon Map)	Fixed Service Providers Governmental Entities Third Parties	File Upload	Coverage map(s) with polygon GIS data indicating the extent of a fixed provider's broadband service availability in an area.

### 5.1 Fixed Broadband Availability Location Lists

If a filer chooses to submit availability data using this format, the file must contain a list of the locations served by a fixed broadband provider. The locations should match and conform to the locations in the FCC's Broadband Serviceable Location Fabric, which will include a unique identifier, the geographic coordinates, and, where available, the address(es) associated with each location.

Because a provider could potentially serve an individual location using multiple technologies, each with its own maximum advertised download and upload speeds, latency flag, and business/residential category, a location can be included multiple times. However, each technology offered to an individual location should have only one record for that technology and location combination. The record should include a single maximum download speed, maximum upload speed, latency flag, and business/residential category reported for that technology.

The file with the list of locations where service is available must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required. Additional information on the formatting of the Location ID field will be provided at a later date.

Field	Header	Data Type	Example	Description / Notes
<b>Provider ID</b>	provider_id	Integer	131425	A unique 6-digit code generated by the FCC that identifies each service provider. The list of Provider IDs will be posted on the FCC's BDC website at <a href="http://www.fcc.gov/BroadbandData/filers">http://www.fcc.gov/BroadbandData/filers</a> .  - When the entity is a service provider, this field is not required and any values entered will be ignored.
<b>Brand Name</b>	brand_name	String	Verizon	Name of the entity or service advertised or offered to consumers.
<b>Location ID</b>	location_id	String		A unique identifier for the location served. A Location ID will be included for each location in the Broadband Serviceable Location Fabric when the Fabric is made available to filers.

Field	Header	Data Type	Example	Description / Notes
<b>Technology</b>	technology	Integer	50	<p>Code for the technology used for the deployed service. The value must be one of the following codes:</p> <ul style="list-style-type: none"> <li><i>0 – Other</i></li> <li><i>10 – Copper Wire (xDSL, Ethernet over Copper, etc.)</i></li> <li><i>40 – Coaxial Cable / HFC (DOCSISx)</i></li> <li><i>50 – Optical Carrier / Fiber to the Premises (Fiber to the home or business end user, does not include “fiber to the curb”)</i></li> <li><i>60 – Geostationary Satellite</i></li> <li><i>61 – Non-geostationary Satellite</i></li> <li><i>70 – Unlicensed Terrestrial Fixed Wireless (including fixed 4G LTE or 5G-NR service provided over a mobile network but sold as a fixed solution, WIFI sold as a fixed solution, microwave, etc. using entirely unlicensed spectrum)</i></li> <li><i>71 – Licensed Terrestrial Fixed Wireless (including fixed 4G LTE or 5G-NR service provided over a mobile network but sold as a fixed solution, WIFI sold as a fixed solution, microwave, etc. using entirely licensed spectrum or a hybrid of license and unlicensed spectrum)</i></li> </ul>

Field	Header	Data Type	Example	Description / Notes
<b>Maximum Advertised Download Speed</b>	max_advertised_download_speed	Integer	1000	<p>Maximum advertised download speed offered to the location in Mbps as an integer. The system will reject a file if the value in this field is not an integer and does not meet the requirements below. It will not round or truncate decimals.</p> <p>If the service offered has a maximum advertised download speed of less than 25 Mbps paired with an upload speed that is less than 3 Mbps, report using one of the following service tiers:</p> <ol style="list-style-type: none"> <li>1) If the maximum download speed is greater than 200 kbps but less than 10 Mbps <u>and</u> the upload speed is less than 1 Mbps: <b>enter 0</b>. The system will ask the filer to confirm that the service offered falls in this tier.</li> <li>2) If the maximum download speed is greater than or equal to 10 Mbps but less than 25 Mbps <u>and</u> the upload speed is greater than or equal to 1 Mbps but less than 3 Mbps: <b>enter 10</b>.</li> </ol> <p>If the service offered has a maximum advertised download speed that is greater than or equal to 25 Mbps <u>and</u> a maximum advertised upload speed that is greater than or equal to 3 Mbps, enter the value of the advertised download speed in Mbps as an integer.</p>



Field	Header	Data Type	Example	Description / Notes
<b>Maximum Advertised Upload Speed</b>	max_advertised_upload_speed	Integer	1000	<p>Maximum advertised upload speed, in Mbps, associated with the maximum advertised download speed offered to the location. Enter the value as an integer. The system will reject a file if the value in this field is not an integer; it will not round or truncate decimals.</p> <p>If the service offered has a maximum advertised upload speed of less than 3 Mbps paired with a maximum advertised download speed that is less than 25 Mbps, report using one of the following service tiers:</p> <ol style="list-style-type: none"> <li>1) If the maximum upload speed is less than 1 Mbps <u>and</u> the download speed is greater than 200 kbps but less than 10 Mbps: <b>enter 0</b>. The system will ask the filer to confirm that the service offered falls in this tier.</li> <li>2) If the maximum upload speed is greater than or equal to 1 Mbps but less than 3 Mbps <u>and</u> the download speed is greater than or equal to 10 Mbps but less than 25 Mbps: <b>enter 1</b>.</li> </ol> <p>If the service offered has a maximum advertised upload speed that is greater than or equal to 3 Mbps paired with a maximum advertised download speed that is greater than or equal to 25 Mbps, enter the value of the advertised upload speed in Mbps as an integer.</p>
<b>Latency</b>	low_latency	Boolean Integer	1	<p>The offered service is low latency, defined as having round-trip latency of less than or equal to 100 milliseconds based on the 95<sup>th</sup> percentile of measurements.</p> <p>- Value must be one of the following codes:</p> <p>0 – False 1 – True</p>
<b>Business / Residential Category</b>	business_residential_code	Enumerated String {1}	B	<p>Enumerated character identifying whether the service at the location is business-only, residential-only, or offered to both business and residential customers.</p> <p>Value entered must be one of the following codes:</p> <p>B – Business-only service R – Residential-only service X – Business and Residential service</p>

## 5.2 Fixed Broadband Availability Coverage Maps

If a fixed broadband provider chooses to submit availability data as a coverage polygon, rather than the list of locations described in Section 5.1 above, the data file must contain GIS data with polygon geometries and associated data attributes. The data must be submitted in one of the following GIS data formats: ESRI Shapefile, ESRI FileGDB, GeoJSON, or Geopackage. The required specifications for the data attribute table in the chosen GIS data file are shown below.

Coverage polygons must only encompass the locations to which the provider either currently provides service or could perform a “standard broadband installation” as defined in the FCC’s rules. Each polygon should represent a unique combination of the following fields: providerid, brandname, technology, maxdown, maxup, lowlatency, and bizrescode. When a service provider reports multiple technologies (or when a governmental or third-party entity reports multiple technologies for an individual service provider), the coverage areas for the different technologies (such as DSL and fiber) can overlap. However, coverage areas for the same technology cannot overlap. If service is offered at different download and upload speeds using the same type of technology, the filer should report the highest speed offered (based on the guidance below). If service is offered at different *maximum* speeds in different areas, the filer must submit separate polygons representing the coverage areas of those different speeds, but the polygons must not overlap.

Data Attribute Field	Data Type	Example	Description / Notes
<b>providerid</b>	Integer	131425	A unique 6-digit code generated by the FCC that identifies each service provider. The list of Provider IDs will be posted on the FCC’s BDC website at <a href="http://www.fcc.gov/BroadbandData/filers">http://www.fcc.gov/BroadbandData/filers</a> .  <i>- Field is not required and any values provided are ignored when the entity is a service provider.</i>
<b>brandname</b>	Text	Verizon	Name of the entity or service advertised or offered to consumers.

Data Attribute Field	Data Type	Example	Description / Notes
<b>technology</b>	Enumerated Integer	50	<p>Code for the technology used for the service offered. The value must be one of the following codes:</p> <p>0 – Other</p> <p>10 – Copper Wire (xDSL, Ethernet over Copper, etc.)</p> <p>40 – Coaxial Cable / HFC (DOCSISx)</p> <p>50 – Optical Carrier / Fiber to the Premises (Fiber to the home or business end user, does not include “fiber to the curb”)</p> <p>60 – Geostationary Satellite</p> <p>61 – Non-geostationary Satellite</p> <p>70 – Unlicensed Terrestrial Fixed Wireless (including fixed 4G LTE or 5G-NR service provided over a mobile network but sold as a fixed solution, WIFI sold as a fixed solution, microwave, etc. using entirely unlicensed spectrum)</p> <p>71 – Licensed Terrestrial Fixed Wireless (including fixed 4G LTE or 5G-NR service provided over a mobile network but sold as a fixed solution, WIFI sold as a fixed solution, microwave, etc. using entirely licensed spectrum or a hybrid of license and unlicensed spectrum)</p>
<b>maxdown</b>	Decimal	100.0	<p>Maximum advertised download speed offered in the service area in Mbps as an integer. The system will reject a file if the value in this field is not an integer; it will not round or truncate decimals.</p> <p>If the service offered has a maximum advertised download speed of less than 25 Mbps paired with an upload speed that is less than 3 Mbps, report using one of the following service tiers:</p> <ol style="list-style-type: none"> <li>1) If the maximum download speed is greater than 200 kbps but less than 10 Mbps and the upload speed is less than 1 Mbps: <b>enter 0</b>. The system will ask the filer to confirm that the service offered falls in this tier.</li> <li>2) If the maximum download speed is greater than or equal to 10 Mbps but less than 25 Mbps, and the upload speed is greater than or equal to 1 Mbps but less than 3 Mbps: <b>enter 10</b>.</li> </ol> <p>If the service offered has a maximum advertised download speed that is greater than or equal to 25 Mbps <u>and</u> a maximum advertised upload speed that is greater than or equal to 3 Mbps, enter the value of the advertised download speed in Mbps as an integer.</p>

Data Attribute Field	Data Type	Example	Description / Notes
<b>maxup</b>	Decimal	10.0	<p>Maximum advertised upload speed, in Mbps, associated with the maximum advertised download speed offered in the service area. Enter the value as an integer. The system will reject a file if the value in this field is not an integer; it will not round or truncate decimals.</p> <p>If the service offered has a maximum advertised upload speed of less than 3 Mbps paired with a maximum advertised download speed that is less than 25 Mbps, report using one of the following service tiers:</p> <ol style="list-style-type: none"> <li>1) If the maximum upload speed is less than 1 Mbps, and the download speed is greater than 200 kbps but less than 10 Mbps: <b>enter 0</b>. The system will ask the filer to confirm that the service offered falls in this tier.</li> <li>2) If the maximum upload speed is greater than or equal to 1 Mbps but less than 3 Mbps, and the download speed is greater than or equal to 10 Mbps but less than 25 Mbps: <b>enter 1</b>.</li> </ol> <p>If the service offered has a maximum advertised upload speed that is greater than or equal to 3 Mbps paired with a maximum advertised download speed that is greater than or equal to 25 Mbps, enter the value of the advertised upload speed in Mbps as an integer.</p>
<b>lowlatency</b>	Boolean Integer	1	<p>The offered service is low latency, defined as having round-trip latency of less than or equal to 100 milliseconds based on the 95<sup>th</sup> percentile of measurements.</p> <p>- <i>Value must be one of the following codes:</i></p> <p>0 – <i>False</i>  1 – <i>True</i></p>
<b>bizrescode</b>	Enumerated Text	B	<p>Enumerated character identifying whether the service at the location is business-only, residential-only, or offered to both business and residential customers.</p> <p><i>Value entered must be one of the following codes:</i></p> <p>B – <i>Business-only service</i>  R – <i>Residential-only service</i>  X – <i>Business and Residential service</i></p>

## 6 Fixed Broadband Supporting Data

All entities that submit fixed broadband availability data are also required to submit information on how they generated their coverage information. Governmental and third-party entities also must provide information on the entities and methodologies used to collect, organize, and verify their data.

Providers of fixed wireless broadband service that submit coverage maps (as opposed to a list of locations) are also required to submit information about their propagation models, base stations, carriers, link budgets, and clutter categories.

The table below provides an overview of the supporting data that entities submitting fixed broadband availability information must file in the BDC system.

Section	Data Item	Entities	Data Collection Method	Description / Notes
6.1	Fixed Broadband Coverage Methodology Information	Fixed Broadband Service Providers Governmental Entities Third Parties	Web Form	Information about how the filer generated the fixed broadband coverage information.
6.2	Verified Fixed Availability Data Information	Governmental Entities Third Parties	Web Form	Information on the entities and methodologies employed to collect, organize, and verify the availability data.
<p><b><i>The following supplemental data are required by terrestrial fixed broadband service providers that submit availability data in a coverage polygon, or by governmental or other entities that submit such data about a terrestrial fixed wireless provider's service availability. Such information is not required if the provider submits Fixed Broadband Coverage Location List data.</i></b></p>				

Section	Data Item	Entities	Data Collection Method	Description / Notes
6.3	Fixed Wireless Propagation Modeling Information	Fixed Wireless Broadband Service Providers Governmental Entities Third Parties	File Upload and Web Form	Information about the propagation modeling and planning tools used to generate the fixed wireless broadband coverage maps of a fixed wireless service provider.  This section includes two parts: 1) Fixed Wireless Propagation Model Details is a file upload that must contain the information specified below on each propagation model used to generate fixed wireless broadband coverage, and 2) Fixed Wireless Propagation Model Conditions Explanation is a web form that must be completed by filers that upload information for more than one propagation model.
6.4	Fixed Wireless Base Station Location and Height	Fixed Wireless Broadband Service Providers Governmental Entities Third Parties	File Upload	Information about each base station used in the propagation modeling that generated the fixed wireless broadband coverage areas.
6.5	Fixed Wireless Base Station Carriers	Fixed Wireless Broadband Service Providers Governmental Entities Third Parties	File Upload	Infrastructure information on the carriers (i.e., antennas) used by each base station in the propagation modeling that generated the fixed wireless broadband coverage areas.
6.6	Fixed Wireless Link Budget Parameters	Fixed Wireless Broadband Service Providers Governmental Entities Third Parties	File Upload	Parameters and values included in all link budgets used in the propagation modeling that generated the fixed wireless broadband coverage areas.

Section	Data Item	Entities	Data Collection Method	Description / Notes
6.7	Fixed Wireless Clutter Category Data	Fixed Wireless Broadband Service Providers Governmental Entities Third Parties	File Upload	Information on each clutter category used in the propagation modeling that generated the fixed wireless broadband coverage areas.

## 6.1 Fixed Broadband Coverage Methodology Information

All fixed broadband providers, as well as all governmental and third-party entities submitting verified data on the availability of fixed broadband service, must submit information on how the filer (or its representative) generated the availability data *for each technology* included in the submission. This information is submitted via a web form in the BDC system with the fields listed below. All values are required except where otherwise noted.

Field	Description / Notes
<b>Methodology</b>	Information on the methodology used to generate the coverage data.
<b>Explanation</b>	Explanation of how the methodologies were implemented.
<b>Distance from the Aggregation Point</b>	In the availability data submitted for a given fixed technology, this is the longest distance between a network aggregation point and a served location, in feet, rounded to the nearest foot.  Report a single value (the highest value) for each technology for which availability data is submitted, in accordance with the FCC's maximum buffer requirements described in Section 5 above; do not report a value for each location. A value must be entered by filers who submit fixed wired broadband availability data as a location list or as a coverage map.  <i>- Value may be null if the technology is terrestrial fixed wireless or satellite.</i>

## 6.2 Verified Fixed Availability Data Information

Only governmental and third-party entities that choose to submit verified availability data must submit this information. It is not required of service providers. The information below must be submitted via web form in the BDC system. If filers use different entities or methodologies to generate data for different providers or technologies, they should indicate this in the form.

Field	Description / Notes
<b>Identity</b>	For governmental or third-party entities that choose to submit verified availability data, the identity of the entity that gathered and/or analyzed broadband availability data (e.g., a contracted engineering firm).  <i>- Value may be null if entity did not use a third-party to gather and/or analyze the data.</i>

Field	Description / Notes
<b>Methodology</b>	For governmental or third-party entities that choose to submit verified availability data, an explanation of how the entity gathered, organized, and verified the availability data submitted. This explanation should include, to the extent relevant, a description of the relationship between the entity and any other firm or organization on which the entity relied for the collection and/or verification of data.

## 6.3 Fixed Wireless Propagation Modeling Information

### 6.3.1 Fixed Wireless Propagation Model Details

This file contains records of each propagation model used to model terrestrial fixed wireless broadband coverage. The file must be in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required unless otherwise indicated.

Field	Header	Data Type {Number of Characters}	Example	Description / Notes
<b>Model ID</b>	model_id	Text	ITM-1A	Unique identifier, assigned by the filer, for the propagation model used to generate the coverage data.
<b>Modeling Tool Name</b>	tool_name	Text	Atoll	Name of the planning tool used to generate the coverage data.
<b>Modeling Tool Version</b>	tool_version	Text	3.4.0	Version number of the planning tool used to generate the coverage data.
<b>Modeling Tool Developer</b>	tool_developer	Text	Forsk	Name of the developer of the planning tool used to generate the coverage data.
<b>Model Resolution</b>	model_resolution	Integer	10	Resolution of the model used to generate the coverage data, in meters.  - Value may be approximate for models measured in arcseconds (e.g., 1 arcsecond $\approx$ 30 meters).  - Value must be greater than 0 and less than or equal to 100.
<b>Receiver Height</b>	receiver_height	Decimal	5.5	Height of the receiver / CPE antenna used in modeling, in meters (with one decimal digit).  - Value must be greater than or equal to 4 and less than or equal to 7.
<b>Terrain Data Source</b>	terrain_source	Text	USGS	Name of the creator, developer, or supplier of the terrain dataset



Field	Header	Data Type {Number of Characters}	Example	Description / Notes
<b>Terrain Data Vintage</b>	terrain_vintage	Date	2021-10-18	Vintage date of terrain dataset, with <i>at least</i> the year of the dataset entered.  - Value must match valid ISO-8601 date format, YYYY-MM-DD. If only the year is entered, then YYYY.
<b>Terrain Resolution</b>	terrain_resolution	Integer	30	Resolution or granularity of terrain data, in meters.  - Value may be approximate for datasets measured in arcseconds (e.g., 1 arcsecond $\approx$ 30 meters).  - Value must be greater than 0 and less than or equal to 100.
<b>Clutter Data Source</b>	clutter_source	Text	ESA Worldcover	Name of the creator, developer, or supplier of the clutter dataset
<b>Clutter Data Vintage</b>	clutter_vintage	Date	2020	Vintage date of clutter dataset, with <i>at least</i> the year of the dataset entered.  - Value must match valid ISO-8601 date format, YYYY-MM-DD. If only the year is entered, then YYYY.
<b>Clutter Data Resolution</b>	clutter_resolution	Integer	10	Resolution or granularity of clutter data, in meters.  - Value may be approximate for datasets measured in arcseconds (e.g., 1 arcsecond $\approx$ 30 meters).
<b>Model Validation</b>	calibration_flag	Boolean Integer {1}	1	The model has been validated and calibrated at least one time using on-the-ground and/or other real-world measurements taken by the provider or its vendor.  - Value must be one of the following codes:  0 – False 1 – True
<b>Model Calibration Date</b>	calibration_date	Date	2021-09-05	Most recent date that the model was calibrated.  - This value may be null.  - If entered, value must match valid ISO-8601 date format including, at a minimum, the year and month, e.g.: YYYY-MM[-DD]

Field	Header	Data Type {Number of Characters}	Example	Description / Notes
<b>Model Calibration Process</b>	calibration_process	Text		Brief narrative summary of the process used to calibrate the model.  - <i>This value may be null.</i>

### 6.3.2 Fixed Wireless Propagation Model Conditions Explanation

If a provider uses more than one propagation model to generate fixed wireless broadband coverage, it must provide a description of the circumstances under which each model is deployed and why. This description must be entered in a web form in the BDC system. Filers that use only one propagation model do not need to enter this form.

Field	Description / Notes
<b>Explanation</b>	Explanation of the conditions under or base stations for which each model and tool (identified in the Fixed Wireless Propagation Model Details file) apply.  - <i>Value may be null if only a single model is used.</i>

### 6.4 Fixed Wireless Base Station Location and Height

This file must contain the records for each base station used to model terrestrial fixed wireless broadband coverage. The file must be in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Site ID</b>	site_id	Text	VA0128	Unique site ID, assigned by the filer, for the base station to which this data record applies.  - <i>Value length must be less than 256 characters.</i>
<b>Latitude</b>	latitude	Decimal	38.903692	Geographic coordinate latitude of the infrastructure in decimal degrees using WGS-84 coordinate reference system.  - <i>Must be a minimum of 6 and a maximum of 7 decimal digits.</i>
<b>Longitude</b>	longitude	Decimal	-77.009676	Geographic coordinate longitude of the infrastructure in decimal degrees using WGS-84 coordinate reference system.  - <i>Must be a minimum of 6 and a maximum of 7 decimal digits.</i>

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Height of Base Station</b>	site_height	Decimal	150.0	Height of the base station site above-mean-sea-level (AMSL), in meters  - Value must be greater than or equal to -100 and less than or equal to 6500.
<b>Model ID</b>	model_id	Text	ITM-1A	Unique identifier for the propagation model used to generate the coverage for the base station.  - Value must correspond to a model_id value in the Fixed Wireless Propagation Model Details file.
<b>Morphology</b>	morphology	Enumerated Integer {1}	2	Code, taken from the list below, indicating the morphology of the area for which coverage is modeled from the base station.  - Value must be one of the following codes:  1 – Urban 2 – Suburban 3 – Rural 0 – Other

## 6.5 Fixed Wireless Base Station Carriers

This file contains the records of each carrier (i.e., antenna) used in each sector of the fixed wireless provider's base stations, as identified in the corresponding Base Station Location and Height data file. The file must be in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required unless otherwise indicated.

Field	Header	Data Type	Example	Description / Notes
<b>Site ID</b>	site_id	Text	VA0128	Unique site ID for the base station with which the carrier/antenna is associated.  - Value must correspond to a site_id value in the Fixed Wireless Base Station Location and Height file.
<b>Antenna Make and Model</b>	antenna_model	Text	PCS-06515-ODH	The make and model of the antenna deployed.  If multiple antennas are used at a particular Site ID, then each should be entered as a separate record.
<b>Technology Code</b>	technology	Enumerated Integer	120	Integer code, taken from the list below, indicating the technology standard used by the channel/carrier described in this record.

Field	Header	Data Type	Example	Description / Notes
				<p>- Value must be one of the following codes:</p> <p>101 – 802.11b  102 – 802.11a  103 – 802.11g  104 – 802.11n/WiFi 4  105 – 802.11ac/WiFi 5  106 – 802.11ax/WiFi 6  120 – 802.11ad  121 – 802.11ay  130 – 802.11ac-derived OFDM  140 – 802.16</p> <p>201 – OFDM Proprietary</p> <p>401 – 4G LTE (3GPP release 8)  402 – 4G LTE (3GPP release 9)  403 – 4G LTE (3GPP release 10)  404 – 4G LTE (3GPP release 11)  405 – 4G LTE (3GPP release 12)  406 – 4G LTE (3GPP release 13)  407 – 4G LTE (3GPP release 14)</p> <p>501 – 5G-NR (3GPP release 15)  502 – 5G-NR (3GPP release 16)  503 – 5G-NR (3GPP release 17)</p> <p>0 – Other</p>
<b>Link Budget ID (Downlink)</b>	downlink_link_budget_id	Text	VA1238DL	<p>Unique identifier for the downlink link budget assumed in generating the coverage data for the base station carrier.</p> <p>- Value must correspond to a link_budget_id value in the downlink Fixed Wireless Link Budget Parameters file.</p>
<b>Link Budget ID (Uplink)</b>	uplink_link_budget_id	Text	VA1238UL	<p>Unique identifier for the uplink link budget assumed in generating the coverage data for the base station carrier.</p> <p>- Value must correspond to a link_budget_id value in the uplink Fixed Wireless Link Budget Parameters file.</p>
<b>Downlink Frequencies with Carrier Aggregation</b>	downlink_carrier_aggregation_frequencies	String	737.5,2172.625	<p>List all downlink frequencies deployed with carrier aggregation with this radio frequency (RF) carrier. List the center frequencies, in MHz, separated by a comma and no space.</p> <p>- Value may be null if downlink carrier aggregation is not used for this RF carrier.</p>

Field	Header	Data Type	Example	Description / Notes
<b>Uplink Frequencies with Carrier Aggregation</b>	uplink_carrier_aggregation_frequencies	String	707.5,1772.625	List all uplink frequencies deployed with carrier aggregation with this RF carrier. List the center frequencies, in MHz, separated by a comma and no space.  - Value may be null if uplink carrier aggregation is not used for this RF carrier.

## 6.6 Fixed Wireless Link Budget Parameters

This file must contain the fields listed below for each fixed wireless link budget, with separate records for each downlink link budget and each uplink link budget. If a service provider uses different link budget parameters for different technologies or spectrum bands, then this file must contain records for each set of distinct downlink / uplink link budget parameters.

The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required unless otherwise indicated.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Link Budget ID</b>	link_budget_id	Text	VA1238UL	VA1238DL	Unique identifier to identify the link budget.  - Value length must be less than 256 characters.
<b>Link Direction</b>	link_direction	Enumerated Text {1}	U	D	Direction of the link budget described in this record.  - Value must be one of the following codes:  U – Uplink D – Downlink

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Technology Code</b>	technology	Enumerated Integer	106	106	<p>Integer code, taken from the list below, indicating the technology standard used by the channel/carrier described in this record.</p> <p>- Value must be one of the following codes:</p> <p>101 – 802.11b  102 – 802.11a  103 – 802.11g  104 – 802.11n/WiFi 4  105 – 802.11ac/WiFi 5  106 – 802.11ax/WiFi 6  120 – 802.11ad  121 – 802.11ay  130 – 802.11ac-derived OFDM  140 – 802.16</p> <p>201 – OFDM Proprietary</p> <p>401 – 4G LTE (3GPP release 8)  402 – 4G LTE (3GPP release 9)  403 – 4G LTE (3GPP release 10)  404 – 4G LTE (3GPP release 11)  405 – 4G LTE (3GPP release 12)  406 – 4G LTE (3GPP release 13)  407 – 4G LTE (3GPP release 14)</p> <p>501 – 5G-NR (3GPP release 15)  502 – 5G-NR (3GPP release 16)  503 – 5G-NR (3GPP release 17)</p> <p>0 – Other</p>
<b>Duplex Scheme</b>	duplex_scheme	Enumerated Text {1}	D	D	<p>Duplex scheme used in the link budget from one of two possible values representing either Frequency Division Duplexing or Time Division Duplexing (including CSMA/CA).</p> <p>- Value must be one of the following codes:</p> <p>F – FDD  D – TDD</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Allocation Ratio</b>	allocation_ratio	Text	2:1	2:1	Downlink to uplink time allocation ratio.  - Value may be null.  - If entered, value must match the format "<numeric>:<numeric>", and each numeric value must be an integer greater than 0.
<b>Morphology</b>	morphology	Enumerated Integer {1}	2	2	Code, taken from the list below, indicating the morphology of the area used in the link budget.  - Value must be one of the following codes:  1 – Urban 2 – Suburban 3 – Rural  0 – Other
<b>Target Speed</b>	target_speed	Decimal	250.0	500.0	Target user speeds of the link budget in Mbps (with up to two decimal digits).  - Value must be greater than or equal to 0 and less than or equal to 10000.
<b>Modulation Scheme</b>	modulation_scheme	Text	256-QAM 3/4	256-QAM 5/6	The modulation and the coding rate used to deliver the target user speed of the link budget. Filers should enter the modulation followed by a space and then a fraction (<numeric>/<numeric>).  - Value must be in the format "<string> <numeric>/<numeric>", and each numeric value must be an integer greater than 0.
<b>Antenna Configuration</b>	antenna_configuration	Text	2x2	4x4	Typical deployed antenna configuration.  - Value must be in the format "<numeric>x<numeric>", and each numeric value must be an integer greater than 0.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Operational Frequency</b>	operational_frequency	Decimal	6750	6750	Center frequency of the operational carrier, in MHz (with up to three decimal digits).  - Value must be greater than 0.
<b>Channel Bandwidth</b>	channel_bandwidth	Decimal	160.0	160.0	Total bandwidth of the operating channel, in MHz (with up to two decimal digits).  - Value must be greater than 0 and less than or equal to 1000.
<b>Subcarriers</b>	total_subcarriers	Integer	1992	1992	Total number of subcarriers for the channel (i.e., resource element) if the provider uses OFDM/OFDMA technology.  - Value may be null if provider does not use OFDM/OFDMA technology.  - If entered, value must greater than 0.
<b>Subcarrier Spacing</b>	subcarrier_spacing	Decimal	78.125	78.125	Subcarrier (or resource element) spacing / bandwidth in KHz if the provider uses OFDM/OFDMA technology (with up to three decimal digits).  - Value may be null if provider does not use OFDM/OFDMA technology.  - If entered, value must be greater than or equal to 15 and less than or equal to 10000.
<b>Cell Loading Factor</b>	cell_load	Decimal	0.5	0.5	Average cell loading factor (both own cell and neighboring cells). Report as a percentage (with up to two decimal digits).  - Value must be greater than or equal to 0.5 and less than or equal to 1.
<b>Required Subcarriers</b>	required_subcarriers	Integer	996	996	Number of required subcarriers to deliver the target user speeds.  - Value must be greater than 0.



Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Required SINR</b>	required_sin r	Decimal	21.5	27.5	Required signal to interference and noise ratio (SINR) to deliver the target speeds, in dB (with up to two decimal digits).  - Value must be greater than or equal to -20 and less than or equal to 50.
<b>Spectral Efficiency</b>	spectral_efficiency	Decimal	3.2	6.5	Required spectral efficiency to deliver the user speeds at the cell edge, in bps / Hz (with up to two decimal digits).  - Value must be greater than 0.
<b>Total Transmitter Power</b>	total_tx_power	Decimal	11.00	18.00	Total transmitter power for the cell, including multiple transmitters, in dBm (with up to two decimal digits).  - Value must be greater than 0.
<b>Total Losses in Transmitting Path</b>	total_tx_losses	Decimal	0.00	2.00	Total losses in the transmitting path from the amplifier to the antenna, in dB (with up to two decimal digits).  - Value must be greater than or equal to 0 and less than or equal to 10.
<b>Transmitting Antenna Gain</b>	tx_antenna_gain	Decimal	25.00	18.00	Transmitting antenna gain, in dBi (with up to two decimal digits).  - Value must be greater than or equal to -20 and less than or equal to 40.
<b>EIRP</b>	total_eirp	Decimal	36.00	36.00	Total maximum effective isotropic radiated power (EIRP), in dBm, including multiple transmitting antennas (with up to two decimal digits).  - Value must be greater than or equal to 0 and less than or equal to 80.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>EIRP per Subcarrier</b>	eirp_per_subcarrier	Decimal	6.02	3.0	<p>Maximum effective isotropic radiated power (including multiple transmitting antennas) per subcarrier, in dBm (with up to two decimal digits).</p> <p>- Value must be less than or equal to the lesser of &lt;total_eirp&gt; and (&lt;total_eirp&gt; - (10*log(&lt;total_subcarriers&gt;)) + 3) for downlink link budgets.</p> <p>- Value must be less than or equal to the lesser of &lt;total_eirp&gt; and (&lt;total_eirp&gt; - (10*log(&lt;required_subcarriers&gt;)) + 3) for uplink link budgets.</p>
<b>Receiving Antenna Gain</b>	rx_antenna_gain	Decimal	18.00	25.00	<p>Receiving antenna gain, in dBi (with up to two decimal digits).</p> <p>- Value must be greater than or equal to -20 and less than or equal to 40.</p>
<b>Total Losses in Receiving Path</b>	total_rx_losses	Decimal	0.00	0.00	<p>Total losses in the receiving path from the antenna to the receiver, in dB (with up to two decimal digits).</p> <p>- Value must be greater than or equal to 0 and less than or equal to 10.</p>
<b>Receiver System Noise Figure</b>	rx_noise_figure	Decimal	3.00	3.00	<p>Noise figure of the receiver system - which could consist of an antenna (circuits), a transmission line, and a receiver - in dB (with up to two decimal digits).</p> <p>- Value must be greater than or equal to 0.</p>
<b>Receiver Sensitivity</b>	rx_sensitivity	Decimal	-100.5	-94.5	<p>Receiver sensitivity, in dBm, per subcarrier (with up to two decimal digits).</p> <p>- Value must be less than 0.</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Thermal Noise Power</b>	thermal_noise_power	Decimal	-173.98	-173.98	Thermal noise power, in dBm, per Hz (with up to two decimal digits). <i>- Value must be less than 0.</i>
<b>Thermal Noise Power per Subcarrier</b>	thermal_noise_power_per_subcarrier	Decimal	-125.05	-125.05	Thermal noise power, in dBm, per subcarrier (with up to two decimal digits). <i>- Value must be less than 0.</i>
<b>Total Noise Power per Subcarrier</b>	total_noise_power_per_subcarrier	Decimal	-122.05	-122.05	Total noise power (thermal & receiver), in dBm, per subcarrier (with up to two decimal digits). <i>- Value must be less than 0.</i>
<b>Fading Standard Deviation</b>	fading_std_deviation	Decimal	6.5	6.5	Standard deviation of the log-normal signal slow fading, in dB (with up to two decimal digits). <i>- Value must be greater than 0.</i>
<b>Cell Edge Probability</b>	cell_edge_probability	Decimal	0.99	0.99	Desired probability of receiving the signal at or above the receiver sensitivity at the cell coverage boundary. Report as a percentage (with up to two decimal digits). <i>- Value must be greater than or equal to 0.75 and less than or equal to 1.</i>
<b>Fade Margin</b>	fade_margin	Decimal	15.00	15.00	Signal slow fading margin required to deliver the desired cell edge reliability, in dB (with up to two decimal digits). <i>- Value must be greater than 0.</i>
<b>Penetration Margin</b>	penetration_margin	Decimal	0.00	0.00	Additional signal loss due to surrounding obstructions when the receiver is inside a building, in dB (with up to two decimal digits). <i>- Value may be null.</i> <i>- If entered, value must be greater than or equal to 0.</i>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Other Losses</b>	other_losses	Decimal	0.00	0.00	Any other unaccounted signal losses, in dB (with up to two decimal digits). - Value may be null. - If entered, value must be greater than or equal to 0.
<b>Other Gains</b>	other_gains	Decimal	0.00	0.00	Other unaccounted gains, in dB (with up to two decimal digits). - Value may be null. - If entered, value must be greater than or equal to 0.
<b>Total Margins</b>	total_margins	Decimal	15.00	15.00	Total net margins, in dB (with up to two decimal digits). - Value must be greater than or equal to 0.
<b>Maximum Allowable Path Loss</b>	mapl	Decimal	107	107.5	Maximum allowable path loss of the link, in dB (with up to two decimal digits). - Value must be greater than 0.
<b>Minimum Signal Strength</b>	minimum_signal_strength	Decimal	-103.5	-104.5	Minimum required signal strength at the receiver to deliver the specified performance targets (e.g., RSRP for 4G LTE), in dBm, per subcarrier (with up to two decimal digits). - Value must be less than 0.

## 6.7 Fixed Wireless Clutter Category Data

This file contains records of each clutter category used in the link budget. The file must be in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required except where otherwise noted.

Field	Header	Data Type	Example	Description / Notes
<b>Clutter Category Number</b>	category_number	Integer	11	Numerical identifier, assigned by the filer, corresponding to each distinct clutter category. - Value must be greater than or equal to 0.
<b>Clutter Category Name</b>	category_description	Text	Evergreen Forest	Name or short description of the clutter category. - Value length must be less than 256 characters.

Field	Header	Data Type	Example	Description / Notes
<b>Constant Signal Loss</b>	constant_signal_loss	Decimal	3	<p>Constant signal loss used in propagation modeling for the clutter category, in dB, with up to one decimal place.</p> <ul style="list-style-type: none"> <li>- Value may be null if the Variable Signal Loss value is not null.</li> <li>- If entered, value must be greater than or equal to 0.</li> </ul>
<b>Variable Signal Loss</b>	variable_signal_loss	Decimal	3	<p>Variable signal loss as a function of distance used in propagation modeling for the clutter category, in dB/meter, with up to one decimal place.</p> <ul style="list-style-type: none"> <li>- Value may be null if the Constant Signal Loss value is not null.</li> <li>- If entered, value must be greater than or equal to 0.</li> </ul>
<b>Model ID</b>	model_id	Text	ITM-1A	<p>Unique identifier for the propagation model that has a list of clutter categories</p> <ul style="list-style-type: none"> <li>- Value should correspond to a model_id value in the Fixed Wireless Propagation Model Details file.</li> </ul>

## 7 Mobile Broadband and Mobile Voice Availability Data

Facilities-based providers of mobile broadband internet access service and/or voice service are required to submit data about where they make mobile service available, including coverage maps for 3G, 4G LTE, 5G-NR, and voice technologies. These coverage maps are based on propagation modeling, and the propagation modeling must be based on the parameters specified in the Broadband DATA Act and adopted by the Commission, which are described in the sections below.

Providers are required to submit two coverage maps for each technology, one modeled for outdoor stationary service and a second modeled for in-vehicle mobile service. In addition, as part of these maps, mobile broadband service providers must incorporate a “heat map” depicting ranges of signal strength within the coverage area.

A list of the coverage maps that each mobile provider must submit is shown in the table below. A provider is not required to submit maps for a particular technology if it does not have a network in service using that technology under the prescribed parameters and does not provide service to end-user customers using that technology.

Section	Data Item	Parties	Description / Notes
7.1	Mobile Broadband Coverage Map	Mobile Service Providers Governmental Entities Third Parties	Coverage maps with polygon GIS data indicating the extent of a mobile service provider’s broadband service for particular technologies, minimum speeds, and handset modeling assumptions (i.e., stationary only vs. both stationary and in-vehicle mobile): <ul style="list-style-type: none"> <li>▪ 3G with speeds greater than or equal to 200 / 50 kbps</li> <li>▪ 4G LTE with speeds greater than or equal to 5 / 1 Mbps</li> <li>▪ 5G-NR with speeds greater than or equal to 7 / 1 Mbps</li> <li>▪ 5G-NR with speeds greater than or equal to 35 / 3 Mbps</li> </ul> <p>- Note: providers need not submit a map for a particular technology if they do not offer service using that technology.</p>
7.2	Mobile Voice Coverage Map	Mobile Service Providers Governmental Entities Third Parties	Coverage maps with polygon GIS data indicating the extent of a mobile service provider’s voice service using any technology for particular handset modeling assumptions (i.e., stationary only vs. both stationary and in-vehicle mobile).

### 7.1 Mobile Broadband Availability Coverage Maps

Mobile broadband service providers are required to submit separate coverage maps based on the following propagation model parameters:

- For 3G coverage, a minimum 90% cell edge probability of a download speed of at least 200 kbps and an upload speed of at least 50 kbps, with a minimum 50% cell loading factor.

- For 4G LTE coverage, a minimum 90% cell edge probability of a download speed of at least 5 Mbps and an upload speed of at least 1 Mbps, with a minimum 50% cell loading factor.
- For 5G-NR coverage, two set of parameters should be modeled:
  - 1) a minimum 90% cell edge probability of a download speed of at least 7 Mbps and an upload speed of at least 1 Mbps, with a minimum 50% cell loading factor; and
  - 2) a minimum 90% cell edge probability of a download speed of at least 35 Mbps and an upload speed of at least 3 Mbps, with a minimum 50% cell loading factor.

For each set of parameters described above, service providers must model and submit polygons showing broadband coverage for two different modeled environments: one that models broadband availability assuming the receiver (i.e., customer handset) is outdoors and stationary; and one that models assuming the receiver is in-vehicle and mobile. Coverage modeled for an in-vehicle mobile environment should be entirely contained within the coverage modeled for an outdoor stationary environment, and thus the coverage polygons should indicate either where the model predicts coverage only for an outdoor stationary environment or where the model predicts coverage for both an outdoor stationary *and* in-vehicle mobile environment.

The required mobile broadband coverage maps must contain GIS data with polygon geometries and associated data attributes. They must be in one of the GIS file formats supported by the BDC system: ESRI Shapefile, ESRI FileGDB, GeoJSON, or Geopackage. The required fields and specifications for the data attributes for these GIS data files are provided in the table. All values are required.

Data Attribute Field	Data Type {number of characters}	Example	Description / Notes
<b>providerid</b>	Integer {6}	130403	A unique 6-digit code generated by the FCC that identifies each service provider. The list of Provider IDs will be posted on the FCC's BDC website at <a href="http://www.fcc.gov/BroadbandData/filers">http://www.fcc.gov/BroadbandData/filers</a> .  <i>- Field is not required and any values provided are ignored when the entity is a service provider.</i>
<b>brandname</b>	Text	T-Mobile	Name of the entity or service advertised or offered to consumers.
<b>technology</b>	Integer	500	Code for the technology used for the deployed service.  <i>- Value must be one of the following codes:</i>  300 – 3G 400 – 4G LTE 500 – 5G-NR

Data Attribute Field	Data Type {number of characters}	Example	Description / Notes
<b>mindown</b>	Decimal	7.0	Minimum download speed for modeled coverage in Mbps.  - Value must be 0.2 when technology value is 300 (i.e., 3G), must be 5.0 when technology value is 400 (i.e., 4G LTE), and must be either 7.0 or 35.0 when technology value is 500 (i.e., 5G-NR).
<b>minup</b>	Decimal	1.0	Minimum upload speed for modeled coverage in Mbps.  - Value must be 0.05 when technology value is 300 (i.e., 3G), must be 1.0 when technology value is 400 (i.e., 4G LTE), and must be either 1.0 or 3.0 when technology value is 500 (i.e., 5G-NR).
<b>minsignal</b>	Integer	-110	Minimum signal strength for modeled coverage, in dBm, assuming an outdoor stationary environment. The value represents predicted RSSI signal strength when the technology code is 300 (i.e., 3G), and it represents predicted RSRP signal strength when the technology code is 400 or 500 (i.e., 4G LTE or 5G-NR).  - Value may be null when technology code is 300 (i.e., 3G) and the area overlaps with another map for the provider with the same stationary value where the technology code is 400 or 500 (i.e., 4G LTE or 5G-NR).  - Value must be greater than or equal to -120 and less than or equal to -50.
<b>environmnt</b>	Enumerated Integer {1}	1	Integer code indicating whether the area is modeled to have coverage when the user equipment is in an outdoor stationary environment only or in both in-vehicle mobile and outdoor stationary environments.  - Value must be one of the following codes:  0 – Outdoor stationary only 1 – In-vehicle mobile and outdoor stationary

## 7.2 Mobile Voice Availability Coverage Maps

Mobile voice service providers are required to submit coverage maps for voice service. As with broadband availability maps, providers must model and submit polygons showing voice coverage for two different modeled environments: one assuming the receiver (i.e., customer handset) is outdoors and stationary, and another assuming the receiver is in-vehicle and mobile. Coverage modeled for an in-vehicle mobile environment should be entirely contained within the coverage modeled for an outdoor stationary environment, and thus the coverage polygons should indicate either where the model predicts coverage only for an outdoor



stationary environment or where the model predicts coverage for both an outdoor stationary and in-vehicle mobile environment.

The required mobile voice coverage maps must contain GIS data with polygon geometries and associated data attributes. They must be in one of the GIS file formats supported by the BDC system: ESRI Shapefile, ESRI FileGDB, GeoJSON, or Geopackage. The required fields and specifications for the data attributes for these GIS data files are provided in the table. All values are required.

Data Attribute Field	Data Type {number of characters}	Example	Description / Notes
<b>providerid</b>	Integer {6}	130403	A unique 6-digit code generated by the FCC that identifies each service provider. The list of Provider IDs will be posted on the FCC’s BDC website at <a href="http://www.fcc.gov/BroadbandData/ffilers">http://www.fcc.gov/BroadbandData/ffilers</a> .  <i>- Field is not required and any values provided are ignored when the entity is a service provider.</i>
<b>brandname</b>	Text	T-Mobile	Name of the entity or service advertised or offered to consumers.
<b>environmnt</b>	Enumerated Integer {1}	0	Integer code indicating whether the area is modeled to have coverage when the user equipment is in an outdoor stationary environment only or in both in-vehicle mobile and outdoor stationary environments.  <i>- Value must be one of the following codes:</i>  <i>0 – Outdoor stationary</i> <i>1 – In-vehicle mobile and outdoor stationary</i>

## 8 Mobile Broadband Supporting Data

Mobile broadband providers, as well as governmental and third-party entities that submit mobile broadband availability data, are required to submit supporting data about how they generated their coverage maps, including propagation model details and link budget information. The table below provides an overview of the supporting data that mobile broadband providers must submit in the BDC system, and the detailed specifications for each file or form are provided in sections 8.1 – 8.7 below.

Governmental and third-party entities that submit mobile broadband coverage data also must provide information on the identity of the entity that collected and/or analyzed the data and the methodologies they used to collect, organize, and verify their broadband availability data (see section 8.7 below).

Section	Data Item	Parties	Data Collection Method	Description / Notes
8.1	Mobile Propagation Modeling Information	Mobile Service Providers Governmental Entities Third Parties	File Upload	Information on the propagation modeling and planning tools used to generate the mobile broadband coverage maps of a mobile service provider.  This section includes two parts: 1) Mobile Propagation Model Details is a file upload that must contain the information specified below on each propagation model used to generate mobile broadband coverage, and 2) Mobile Propagation Model Conditions Explanation is a web form that must be completed by filers that upload information for more than mobile propagation model.
8.2	Mobile Link Budget Parameters	Mobile Service Providers Governmental Entities Third Parties	File Upload	Parameters and values included in the link budgets used to generate the coverage maps for a mobile service provider at the defined coverage map speeds.
8.3	Mobile Clutter Category Data	Mobile Service Providers Governmental Entities Third Parties	File Upload	List of clutter categories used, a description of each clutter category, and a propagation loss value due to clutter for each category used in the propagation modeling that generated the mobile broadband coverage areas.
8.4	Mobile Propagation Model and Link Budget Association	Mobile Service Providers Governmental Entities Third Parties	File Upload	A list of the propagation model IDs associated with particular link budgets, and the link budget IDs associated with particular propagation models.

Section	Data Item	Parties	Data Collection Method	Description / Notes
8.5	Mobile Link Budget Parameters Rationale	Mobile Service Providers Governmental Entities Third Parties	Web Form	An explanation of certain link budget parameter values reported in the Mobile Link Budget Parameters table, for each link budget that was used to generate the mobile broadband coverage areas.
8.6	Mobile Link Budget Description	Mobile Service Providers Governmental Entities Third Parties	Web Form	A description of how the link budgets were created, for each link budget that was used to generate the mobile broadband coverage areas.
8.7	Verified Mobile Broadband Availability Data Information	Governmental Entities Third Parties	Web Form	The following information on the entity(ies) and methodology(ies) employed to collect, organize, and verify the broadband availability data: <ul style="list-style-type: none"> <li>identity of the entity that gathered and/or analyzed broadband availability data; and</li> <li>the methodologies used in collecting, organizing, and verifying the broadband availability data submitted.</li> </ul>

## 8.1 Mobile Propagation Modeling Information

### 8.1.1 Mobile Propagation Model Details

This file contains records of each propagation model used to model mobile broadband coverage. The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required unless otherwise indicated.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Model ID</b>	model_id	Text	ITM-1A	Unique identifier, assigned by the filer, for the propagation model used to generate the coverage data.  - Value length must be less than 256 characters.
<b>Modeling Tool Name</b>	tool_name	Text	Atoll	Name of the planning tool used to generate the coverage data.
<b>Modeling Tool Version</b>	tool_version	Text	3.4.0	Version number of the planning tool used to generate the coverage data.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Modeling Tool Developer</b>	tool_developer	Text	Forsk	Name of the developer of the planning tool used to generate the coverage data.
<b>Model Resolution</b>	model_resolution	Integer	10	Resolution of the model used to generate the coverage data, in meters.  - Value may be approximate for models measured in arcseconds (e.g., 1 arcsecond $\approx$ 30 meters).  - Value must be greater than 0 and less than or equal to 100.
<b>Receiver Height</b>	receiver_height	Decimal	1.5	Height of the receiver used in modeling, in meters.  - Value must be greater than or equal to 1.5.
<b>Terrain Data Source</b>	terrain_source	Text	USGS	Name of the creator, developer, or supplier of the terrain dataset
<b>Terrain Data Vintage</b>	terrain_vintage	Date	2021-10-18	Vintage date of terrain dataset, with <i>at least</i> the year of the dataset entered.  - Value must match valid ISO-8601 date format, YYYY-MM-DD. If only the year is entered, then YYYY.
<b>Terrain Resolution</b>	terrain_resolution	Integer	30	Resolution or granularity of terrain data, in meters.  - Value may be approximate for datasets measured in arcseconds (e.g., 1 arcsecond $\approx$ 30 meters).  - Value must be greater than 0 and less than or equal to 100.
<b>Clutter Data Source</b>	clutter_source	Text	ESA Worldcover	Name of the creator, developer, or supplier of the clutter dataset
<b>Clutter Data Vintage</b>	clutter_vintage	Date	2020	Vintage date of clutter dataset, with <i>at least</i> the year of the dataset entered.  - Value must match valid ISO-8601 date format, YYYY-MM-DD. If only the year is entered, then YYYY.

Field	Header	Data Type {number of characters}	Example	Description / Notes
<b>Clutter Data Resolution</b>	clutter_resolution	Integer	10	Resolution or granularity of clutter data, in meters.  - Value may be approximate for datasets measured in arcseconds (e.g., 1 arcsecond ≈ 30 meters).  - Value must be greater than 0 and less than or equal to 100.
<b>Model Validation</b>	calibration_flag	Boolean Integer {1}	1	The model has been validated and calibrated at least one time using on-the-ground and/or other real-world measurements taken by the provider or its vendor.  - Value must be one of the following codes:  0 – False 1 – True
<b>Model Calibration Date</b>	calibration_date	Date	2021-09-05	Most recent date that the model was calibrated.  - Value must match valid ISO-8601 date format including, at a minimum, the year and month, e.g.: YYYY-MM[-DD]
<b>Model Calibration Process</b>	calibration_process	Text		Brief narrative summary of the process used to calibrate the model.

### 8.1.2 Mobile Propagation Model Conditions Explanation

If a provider uses more than one propagation model to generate mobile wireless broadband coverage, it must provide a description of the circumstances under which each model is deployed and why. This description must be entered in a web form in the BDC system. Filers that use only one propagation model do not need to enter this form.

Field	Description / Notes
<b>Explanation</b>	Explanation of the conditions under or base stations for which each model and tool (identified in the Fixed Wireless Propagation Model Details file) apply.  - Value may be null if only a single model is used.

## 8.2 Mobile Link Budget Parameters

This file contains records of each mobile link budget, including separate records for each downlink link budget and each uplink link budget. The file must include the fields listed below for each link budget. If a service provider uses different link budget parameters for different technologies or spectrum bands, this file must contain records for each set of distinct downlink / uplink link budget parameters.

The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required unless otherwise indicated.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Link Budget ID</b>	link_budget_id	Text	VA1238UL	VA1238DL	Unique identifier to identify the link budget.  - Value length must be less than 256 characters.
<b>Link Direction</b>	link_direction	Enumerated Text {1}	U	D	Direction of the link budget described in this record.  - Value must be one of the following codes:  <i>U</i> – Uplink <i>D</i> – Downlink

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Technology Code</b>	technology	Enumerated Integer	501	501	<p>Integer code, taken from the list below, indicating the technology standard used by the channel/carrier described in this record.</p> <p>- Value must be one of the following codes:</p> <p>310 – 3G (CDMA-based, including CDMA and EVDO / EVDO Rev. A)</p> <p>320 – 3G (GSM-based, including GSM, WCDMA / UMTS / HSPA, and HSPA+)</p> <p>401 – 4G LTE (3GPP release 8)</p> <p>402 – 4G LTE (3GPP release 9)</p> <p>403 – 4G LTE (3GPP release 10)</p> <p>404 – 4G LTE (3GPP release 11)</p> <p>405 – 4G LTE (3GPP release 12)</p> <p>406 – 4G LTE (3GPP release 13)</p> <p>407 – 4G LTE (3GPP release 14)</p> <p>501 – 5G-NR (3GPP release 15)</p> <p>502 – 5G-NR (3GPP release 16)</p> <p>503 – 5G-NR (3GPP release 17)</p> <p>0 – Other</p>
<b>Duplex Scheme</b>	duplex_scheme	Enumerated Text {1}	F	F	<p>Duplex scheme used in the link budget from one of two possible values representing either Frequency Division Duplexing or Time Division Duplexing (including CSMA/CA).</p> <p>- Value must be one of the following codes:</p> <p>F – FDD</p> <p>D – TDD</p>
<b>Allocation Ratio</b>	allocation_ratio	Text	2:1	2:1	<p>Downlink to uplink time allocation ratio.</p> <p>- Value may be null.</p> <p>- If entered, value must match the format "&lt;numeric&gt;:&lt;numeric&gt;", and each numeric value must be an integer greater than 0.</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Morphology</b>	morphology	Enumerated Integer {1}	2	2	Code, taken from the list below, indicating the morphology of the area used in the link budget.  - Value must be one of the following codes:  1 – Urban 2 – Suburban 3 – Rural  0 – Other
<b>Propagation Conditions</b>	propagation_conditions	Enumerated Integer {1}	0	0	Integer code, taken from the two options below, indicating the propagation conditions used in the link budget.  - Value must be one of the following codes:  0 – Outdoor stationary 1 – In-vehicle mobile
<b>Target Speed</b>	target_speed	Decimal	3.0	35.0	Target user speeds of the link budget in Mbps.  - Value must be 0.2 for downlink records and must be 0.05 for uplink records when technology is 3G.  - Value must be 5 for downlink records and must be 1 for uplink records when technology is 4G LTE.  - Value must be either 35 or 7 for downlink records and must be either 3 or 1 for uplink records when technology is 5G-NR.



Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Modulation Scheme</b>	modulation_scheme	Text	16-QAM 2/3	16-QAM 2/3	<p>The modulation and the coding rate used to deliver the target user speed of the link budget. Filers should enter the modulation followed by a space and then a fraction (&lt;numeric&gt;/&lt;numeric&gt;).</p> <p>- Value must be in the format "&lt;string&gt; &lt;numeric&gt;/&lt;numeric&gt;", and each numeric value must be an integer greater than 0.</p> <p>- Value for this field must have a corresponding explanation/rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>
<b>Antenna Configuration</b>	antenna_configuration	Text	1x2	2x2	<p>Typical deployed antenna configuration.</p> <p>- Value must be in the format "&lt;numeric&gt;x&lt;numeric&gt;", and each numeric value must be an integer greater than 0.</p>
<b>Operational Frequency</b>	operational_frequency	Decimal	1860.0	1940.0	<p>Center frequency of the operational carrier, in MHz (with three decimal places).</p> <p>- Value must be greater than 0.</p>
<b>Channel Bandwidth</b>	channel_bandwidth	Decimal	10.0	10.0	<p>Total bandwidth of the operating channel, in MHz (with up to two decimal places).</p> <p>- Value must be greater than or equal to 0 and less than or equal to 1000.</p>
<b>Subcarriers</b>	total_subcarriers	Integer	600	600	<p>Total number of subcarriers for the channel (i.e., resource element) if the provider uses OFDM/OFDMA technology.</p> <p>- Value may be null if provider does not use OFDM/OFDMA technology.</p> <p>- If entered, value must be greater than 0.</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Subcarrier Spacing</b>	subcarrier_spacing	Decimal	15.0	15.0	Subcarrier (or resource element) spacing / bandwidth, in KHz, if the provider uses OFDM/OFDMA technology (with up to three decimal places).  - Value may be null if provider does not use OFDM/OFDMA technology. - If entered, value must be greater than or equal to 15 and less than or equal to 240.
<b>Cell Loading Factor</b>	cell_load	Decimal	0.5	0.5	Average cell loading factor (both own cell and neighboring cells). Report as a percentage (with up to two decimal places).  - Value must be greater than or equal to 0.5 and less than or equal to 1.
<b>Required Subcarriers</b>	required_subcarriers	Integer	72	200	Number of subcarriers required to deliver the target user speeds.  - Value must be greater than 0. - Value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Required SINR</b>	required_sinr	Decimal	0.00	4.00	Required signal to interference and noise ratio (SINR) to deliver the target speeds, in dB (with up to two decimal places).  - Value must be greater than or equal to -20 and less than or equal to 50.  - Value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Spectral Efficiency</b>	spectral_ef ficiency	Decimal	1.00	1.70	Required spectral efficiency to deliver the user speeds at the cell edge, in bps / Hz (with up to two decimal places).  - Value must be greater than or equal to 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Total Transmitter Power</b>	total_tx_po wer	Decimal	23.00	30.00	Total transmitter power for the cell, including multiple transmitters, in dBm (with up to two decimal places).  - Value must be greater than or equal to 0.
<b>Total Losses in Transmitting Path</b>	total_tx_lo sses	Decimal	0.00	2.00	Total losses in the transmitting path from the amplifier to the antenna, in dB (with up to two decimal places).  - Value must be greater than or equal to 0 and less than or equal to 10.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Transmitting Antenna Gain</b>	tx_antenna _gain	Decimal	-1.00	16.00	Transmitting antenna gain, in dBi (with up to two decimal places).  - Value must be greater than or equal to -20 and less than or equal to 40.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>EIRP</b>	total_eirp	Decimal	22.00	60.00	<p>Total maximum effective isotropic radiated power (EIRP), in dBm, including multiple transmitting antennas, (with up to two decimal places).</p> <p>- Value must be greater than or equal to 0 and less than or equal to 80.</p> <p>- Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>
<b>EIRP per Subcarrier</b>	eirp_per_subcarrier	Decimal	3.43	32.22	<p>Maximum effective isotropic radiated power (including multiple transmitting antennas) per subcarrier, in dBm (with up to two decimal places).</p> <p>- Value must be less than or equal to the lesser of &lt;total_eirp&gt; and <math>(\text{&lt;total\_eirp&gt; - (10 * \log(\text{&lt;total\_subcarriers&gt;)) + 3})</math> for downlink link budgets.</p> <p>- Value must be less than or equal to the lesser of &lt;total_eirp&gt; and <math>(\text{&lt;total\_eirp&gt; - (10 * \log(\text{&lt;required\_subcarriers&gt;)) + 3})</math> for uplink link budgets.</p> <p>- Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>
<b>Receiving Antenna Gain</b>	rx_antenna_gain	Decimal	16.00	0.00	<p>Receiving antenna gain, in dBi (with up to two decimal places).</p> <p>- Value must be greater than or equal to -20 and less than or equal to 40.</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Total Losses in Receiving Path</b>	total_rx_losses	Decimal	2.00	0.00	Total losses in the receiving path from the antenna to the receiver, in dB (with up to two decimal places).  - Value must be greater than or equal to 0 and less than or equal to 10.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Receiver System Noise Figure</b>	rx_noise_figure	Decimal	2.00	10.00	Noise figure of the receiver system - which could consist of an antenna (circuits), a transmission line, and a receiver - in dB (with up to two decimal places).  - Value must be greater than or equal to 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Receiver Sensitivity</b>	rx_sensitivity	Decimal	-130.21	-118.21	Receiver sensitivity per subcarrier, in dBm (with up to two decimal places).  - Value must be less than 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Thermal Noise Power</b>	thermal_noise_power	Decimal	-173.98	-173.98	Thermal noise power, in dBm per Hz (with up to two decimal places).  - Value must be less than 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Thermal Noise Power per Subcarrier</b>	thermal_noise_power_per_subcarrier	Decimal	-132.21	-132.21	Thermal noise power, in dBm, per subcarrier (with up to two decimal places).  - Value must be less than 0.
<b>Total Noise Power per Subcarrier</b>	total_noise_power_per_subcarrier	Decimal	-130.21	-122.21	Total noise power (thermal and receiver), in dBm, per subcarrier (with up to two decimal places).  - Value must be less than 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Fading Standard Deviation</b>	fading_std_deviation	Decimal	8.00	8.00	Standard deviation of the log-normal signal slow fading, in dB (with up to two decimal places).  - Value must be less than 0.
<b>Cell Edge Probability</b>	cell_edge_probability	Decimal	0.9	0.9	Desired probability of receiving the signal at or above the receiver sensitivity at the cell coverage boundary. Report as a percentage with up to two decimal places.  - Value must be greater than or equal to 0.9 and less than or equal to 1.
<b>Fade Margin</b>	fade_margin	Decimal	10.25	10.25	Signal slow fading margin required to deliver the desired cell edge reliability, in dB (with up to two decimal places).  - Value must be greater than 0.  - Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Head and Body Loss</b>	head_body_loss	Decimal	0.00	2.00	<p>Typical signal loss at the operating frequency, in dB, due to head and/or body obstruction (with up to two decimal places).</p> <p>- Value must be greater than or equal to 0.</p> <p>- Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>
<b>Interference Margin</b>	interference_margin	Decimal	3.00	5.00	<p>Additional signal loss, in dB, due to interference from adjacent cells due to cell loading (with up to two decimal places).</p> <p>- Value must be greater than or equal to 0.</p> <p>- Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>
<b>Penetration Margin</b>	penetration_margin	Decimal	0.00	0.00	<p>Additional signal loss due to surrounding obstructions when the receiver is inside a vehicle, in dB (with up to two decimal places).</p> <p>- Value must be greater than or equal to 0.</p> <p>- Value for this field must have a corresponding explanation/ rationale in the Mobile Link Budget Parameters Rationale file for each link budget.</p>

Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Other Losses</b>	other_losse s	Decimal	0.00	0.00	Any other unaccounted signal losses, in dB (with up to two decimal places).  - Value may be null.  - If entered, value must be greater than or equal to 0.  - If entered, value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Frequency Selection Gain</b>	freq_select ion_gain	Decimal	0.00	0.00	Dynamic frequency selection gain, in dB (with up to two decimal places).  - Value must be greater than or equal to 0.  - Value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Multi-Cell Switching Gain</b>	multi_cell_ diversity_g ain	Decimal	2.00	2.00	Multi-cell switching or macro-diversity gain, in dB (with up to two decimal places).  - Value must be greater than or equal to 0.  - Value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.
<b>Other Gains</b>	other_gain s	Decimal	0.00	0.00	Other unaccounted gains, in dB (with up to two decimal places).  - Value may be null.  - If entered, value must be greater than or equal to 0.  - If entered, value for this field must have a corresponding explanation / rationale in the Mobile Link Budget Parameters Rationale file for each link budget.



Field	Header	Data Type {number of characters}	Uplink Example	Downlink Example	Description / Notes
<b>Total Margins</b>	total_margins	Decimal	11.25	15.25	Total net margins, in dB (with up to two decimal places).  - Value must be greater than or equal to 0.
<b>Maximum Allowable Path Loss</b>	mapl	Decimal	136.39	139.18	Maximum allowable path loss of the link, in dB (with up to two decimal places).  - Value must be greater than 0.
<b>Minimum Signal Strength</b>	minimum_signal_strength	Decimal	-132.96	-106.96	Minimum required signal strength at the receiver to deliver the specified performance targets (e.g., RSRP for 4G LTE), in dBm, per subcarrier (with up to two decimal places).  - Value must be less than 0.  - Value for this field must have a corresponding explanation/rationale in the Mobile Link Budget Parameters Rationale file for each link budget.

### 8.3 Mobile Clutter Category Data

This file contains records of each clutter category used in the link budget. The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required, except where otherwise noted.

Field	Header	Data Type	Example	Description / Notes
<b>Clutter Category Number</b>	category_number	Integer	11	Numerical identifier, assigned by the filer, corresponding to each distinct clutter category.  - Value must be greater than or equal to 0.
<b>Clutter Category Name</b>	category_description	Text	Evergreen Forest	Name or short description of the clutter category.  - Value length must be less than 256 characters.
<b>Constant Signal Loss</b>	constant_signal_loss	Decimal	3	Constant signal loss used in propagation modeling for the clutter category, in dB, with up to 1 one decimal place.  - Value may be null if the variable_signal_loss value is not null.  - If entered, value must be greater than or equal to 0.

Field	Header	Data Type	Example	Description / Notes
<b>Variable Signal Loss</b>	variable_signal_loss	Decimal	3	Variable signal loss as a function of distance used in propagation modeling for the clutter category, in dB/meter, with up to one decimal place.  - Value may be null if the constant_signal_loss value is not null.  - If entered, value must be greater than or equal to 0.
<b>Model ID</b>	model_id	Text	ITM-1A	Unique identifier for the propagation model that has a list of clutter categories.  - Value should correspond to a model_id value in the Mobile Propagation Model Details file.

#### 8.4 Mobile Propagation Model and Link Budget Association

This file contains records of the propagation model IDs and their associated with link budget IDs, noting that there can be a many-to-many relationship between link budgets and propagation models. The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Field	Header	Data Type	Example	Description / Notes
<b>Model ID</b>	model_id	Text	ITM-1A	Unique identifier of a propagation model used to generate the mobile coverage data and associated with at least one link budget.  - Value length must be less than 256 characters.  - Value should correspond to a model_id value in the Mobile Propagation Model Details file.
<b>Link Budget ID</b>	link_budget_id	Text	VA1238DL	Unique identifier of a link budget used to generate the mobile coverage data and associated with at least one propagation model.  - Value length must be less than 256 characters.  - Value should correspond to a link_budget_id value in the Mobile Link Budget Parameters file.

#### 8.5 Mobile Link Budget Parameters Rationale

This file contains an explanation / rationale for the particular values reported in the provider's Mobile Link Budget Parameters table (Section 8.2). Unless the reported link budget parameter is null, filers must include, for each separate link budget, an explanation / rationale for the reported value for the following link budget parameters:

- Modulation Scheme (modulation\_scheme)

- Required subcarriers (required\_subcarriers)
- Required SINR (required\_sinr)
- Spectral Efficiency (spectral\_efficiency)
- Total Losses in Transmitting Path (total\_tx\_losses)
- EIRP (total\_eirp)
- EIRP per Subcarrier (eirp\_per\_subcarrier)
- Total Losses in Receiving Path (total\_rx\_losses)
- Receiver System Noise Figure (rx\_noise\_figure)
- Receiver Sensitivity (rx\_sensitivity)
- Thermal Noise Power (thermal\_noise\_power)
- Total Noise Power per Subcarrier (thermal\_noise\_power\_per\_subcarrier)
- Fade Margin (fade\_margin)
- Head and Body Loss (head\_body\_loss)
- Interference Margin (interference\_margin)
- Penetration Margin (penetration\_margin)
- Other Losses (other\_losses)
- Frequency Selection Gain (freq\_selection\_gain)
- Multi-Cell Switching Gain (multi\_cell\_diversity\_gain)
- Other Gains (other\_gains)
- Minimum Signal Strength (maximum\_signal\_strength)

The file must be uploaded in Comma Separated Value (CSV) format and match the specifications in the table below. All values are required.

Field	Header	Data Type	Example	Description / Notes
<b>Link Budget ID</b>	link_budget_id	Text	VA1238DL	Unique identifier of a link budget used to generate the mobile coverage data and is associated with at least one propagation model.  - Value length must be less than 256 characters.  - Value should correspond to a link_budget_id value in the Mobile Link Budget Parameters file.
<b>Parameter</b>	parameter	Enumerated Text (see bulleted list of fields/headers above)	fade_margin	Field name header identifying the parameter.  - Value should correspond to one of the required field names (see list above) from the Mobile Link Budget Parameters file. Enter the specified header for the field.

Field	Header	Data Type	Example	Description / Notes
<b>Rationale</b>	rationale	Text	The value of 10.3 dB corresponds to 90% cell edge coverage probability with 8 dB fade margin standard deviation. 8 dB fade margin standard deviation is reasonable based on previous studies [enter citation]	Short narrative explaining why a particular value was chosen in the link budget with citations where possible.

## 8.6 Mobile Link Budget Description

In this web form, filers must provide a description of how the link budgets were created for each link budget that was used to generate the mobile broadband availability data.

Field	Description / Notes
<b>Description</b>	Narrative description of how the link budgets (identified in the Mobile Link Budget Parameters file) were created.

## 8.7 Verified Mobile Broadband Availability Data Information

Only governmental and third-party entities submitting verified broadband availability data must submit this information. It is not required of service providers. The information below must be submitted via web form in the BDC system. If filers use different entities or methodologies to generate data for different providers or technologies, they should indicate that in the form.

Field	Description / Notes
<b>Identity</b>	For governmental or third-party entities that choose to submit verified availability data, the identity of the entity that gathered and/or analyzed broadband availability data (e.g., a contracted engineering firm).  <i>- Value may be null if entity did not use a third-party to gather and/or analyze the data.</i>
<b>Methodology</b>	For governmental or third-party entities that choose to submit verified availability data, an explanation of how the entity gathered, organized, and verified the availability data submitted. This explanation should include, to the extent relevant, a description of the relationship between the entity and any other firm or organization on which the entity relied for the collection and/or verification of data.