MOBILE CHALLENGE PROCESS

(MCP) Thresholds and Examples

24 October 2024

MCP Basics - Area

- National Broadband Map uses a hex-based system for displaying and defining areas of mobile coverage
- Smallest Area that can be Challenged is 0.7 km2
  - About the size of 140 football fields
  - Called a hex-8
- Each hex-8 contains 7 child hex-9s
  - A hex-9 is about the size of 20 football fields or 0.1 km^2

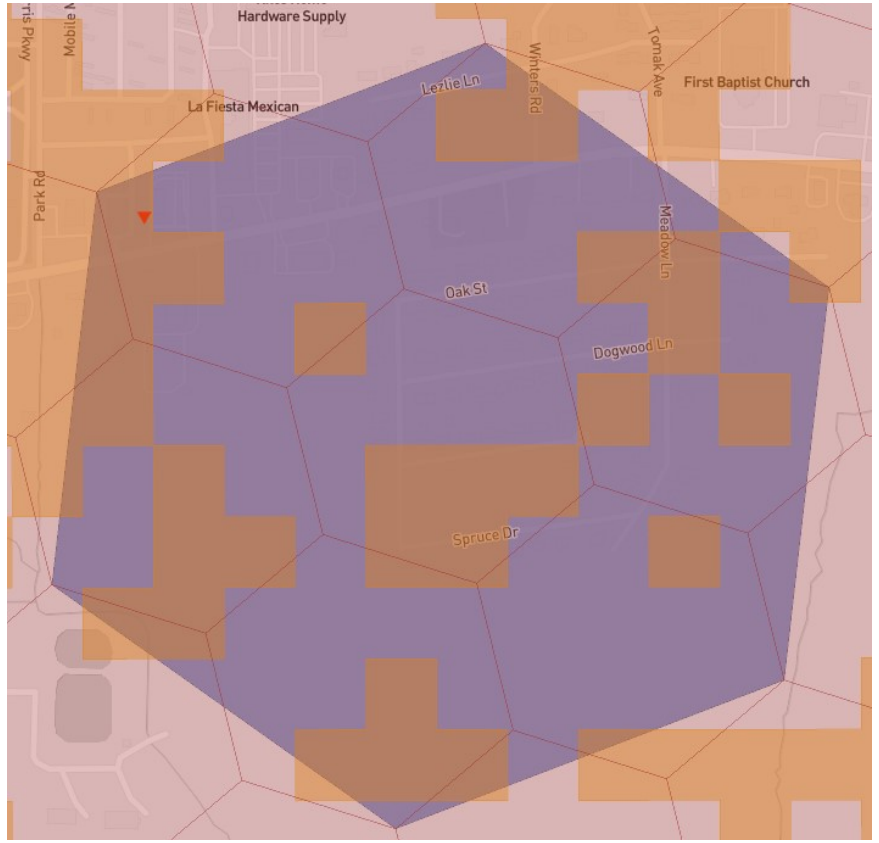
MCP Basics - Speed Tests

Each speed test measures **download** speed and **upload** speed (components)

- Download and upload components are classified as *positive* or *negative*

All tests must be conducted within the mobile service provider's claimed coverage area

- Tests conducted in the **Outdoor** mode challenge **Outdoor Stationary** coverage
  - Outdoor tests may also create a "collateral" challenge to In-Vehicle Mobile coverage in that hex-8
- Tests conducted in the **In-Vehicle** mode challenge the **In-Vehicle Mobile** coverage



MCP Basics - Thresholds

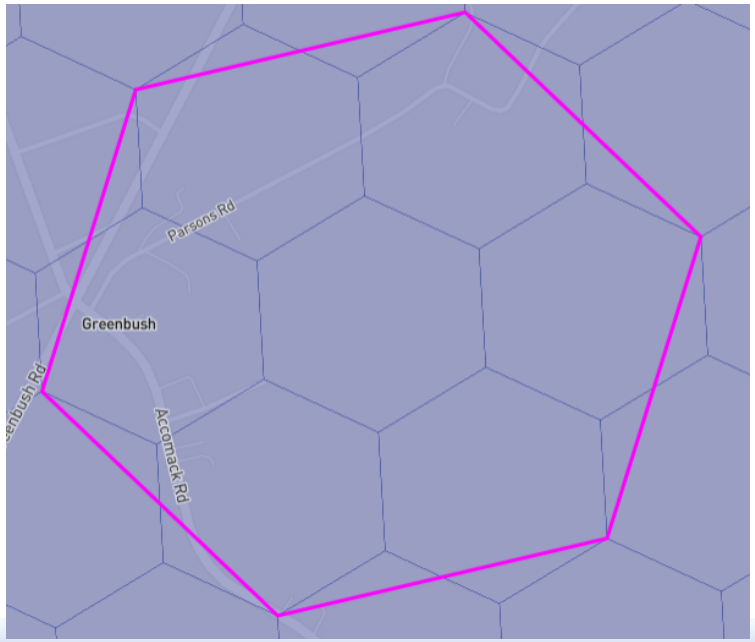
- Thresholds ensure a statistically valid sample of speed tests
  1. Geographic Threshold
  2. Temporal Threshold
  3. Testing Threshold
- Download and upload are evaluated independently: if either the download components OR upload components meet the 3 thresholds, the hex-8 would be considered challenged
- Full descriptions of the Mobile Challenge Process can be found in the Mobile Technical Requirements Order, Section III.A - "Mobile Service Challenge Process"

Geographic Threshold

- Ensures poor coverage is widespread within the area being challenged
- Must have at least 2 test components with at least 1 negative component in the minimum number of accessible hex-9s
- **Accessibility**: Depending on the road coverage within the hex-8 and the provider's coverage area, the number of hex-9s required to have speed tests varies

Number of Accessible Hex-9s in a Hex-8	Minimum Number of Accessible Hex-9s
4 - 7	4
3	3
2	2
1	1
0	0*

*Hex-8 must contain tests that satisfy the temporal threshold and testing threshold



Temporal Threshold

- Ensures that poor coverage exists at multiple times per day.
- Within the challenged area, there must be a set of 2 negative components with a time-of-day difference of at least 4 hours with another set of 2 other negative components
- Tests #1 & #2 and tests #6 & #7 are 2 sets of negative components that satisfy the temporal threshold

Test ID	Date	Time	Download
1	22-Oct-24	8:00am	3.3
2	22-Oct-24	8:01am	2.5
3	22-Oct-24	8:03am	6.6
4	22-Oct-24	10:40am	10.3
5	22-Oct-24	11:34am	4.3
6	23-Oct-24	1:00pm	1.2
7	23-Oct-24	1:01pm	2.4
8	23-Oct-24	1:03pm	6.3
9	23-Oct-24	4:43pm	8.2
10	23-Oct-24	4:56pm	9.4

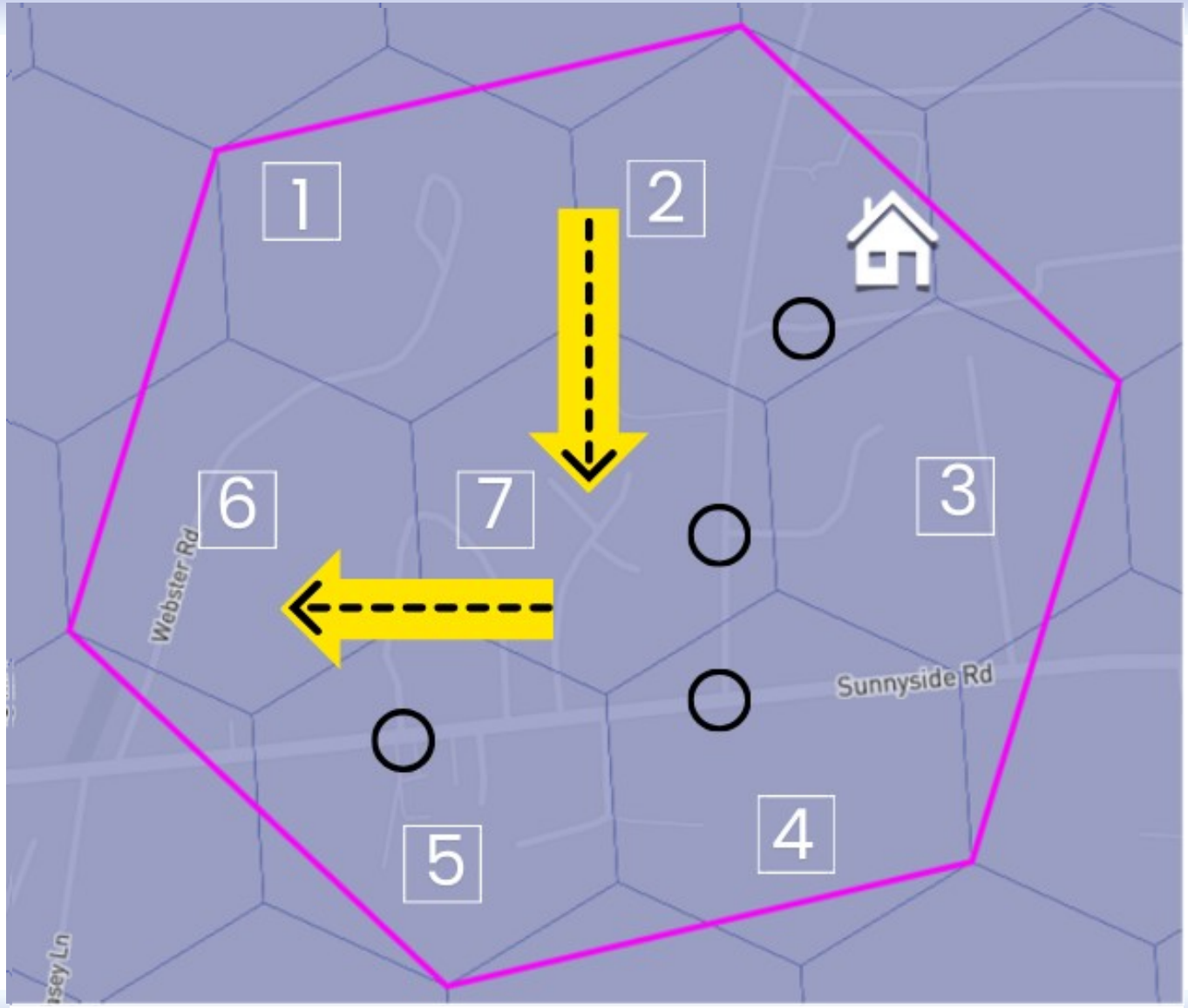
Testing Threshold

- Ensures that we have enough speed tests to reliably make a statistical conclusion
- The number of negative components relative to the number of total components ("failure rate") must meet a certain threshold depending on the total number of speed tests conducted in the area

Total Number of Components	Count or % of Negative Components
20 or fewer	5 components
21-29	24%
30-45	22%
46-60	20%
61-70	18%
71-99	17%
100 or greater	16%

Testing on Your Commute

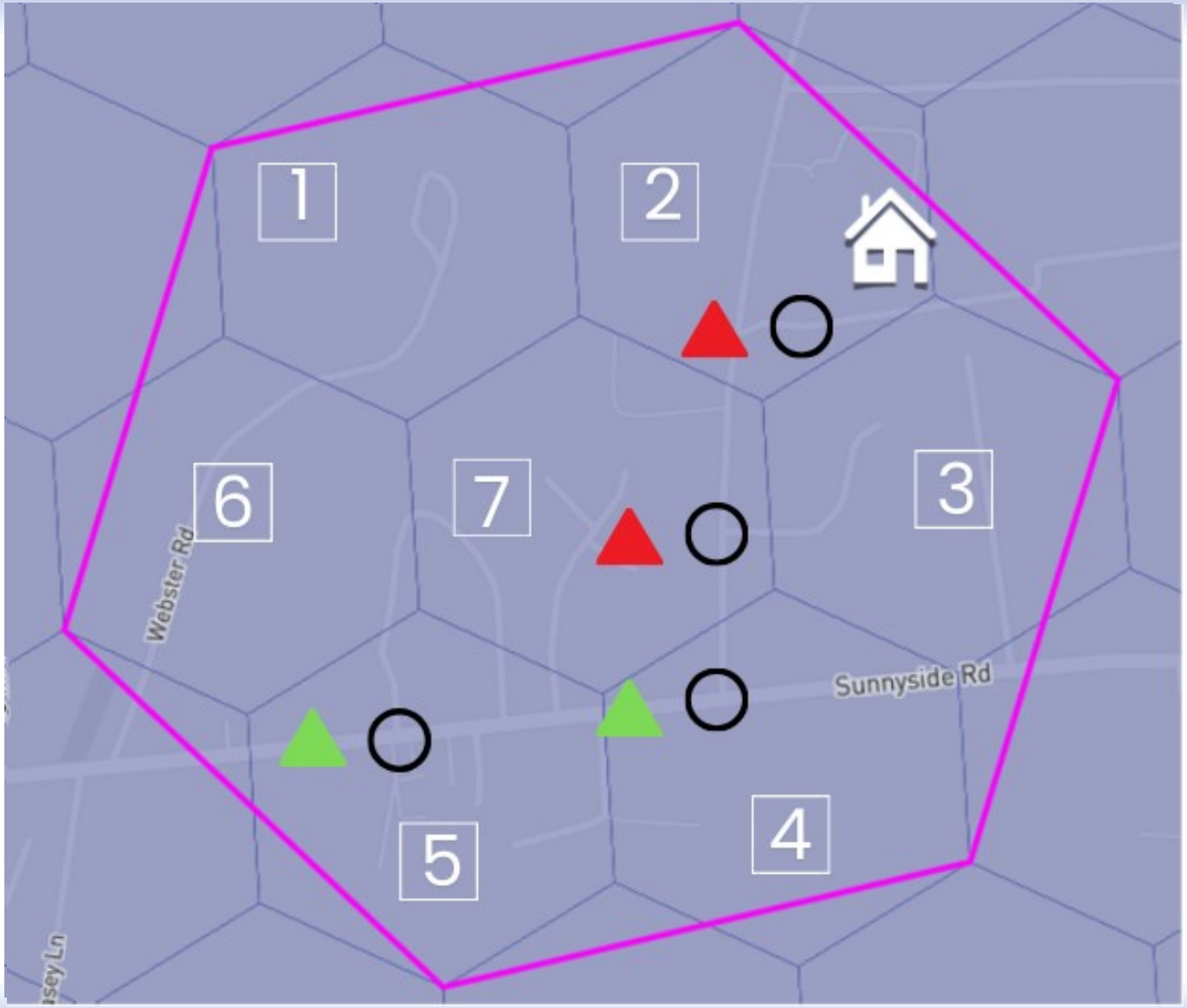
- 4G LTE In-Vehicle Mobile
  - 100% Coverage at 5/1 Mbps
- 7 Accessible hex-9s → Geographic Threshold is 4
- Identify locations in at least 4 different hex-9s within the hex-8 to conduct speed tests



Morning Commute

- We conduct 1 speed test in each of the identified child hex-9s
- The upload components did not meet the 1 Mbps threshold in hex-9s #2 and #7.

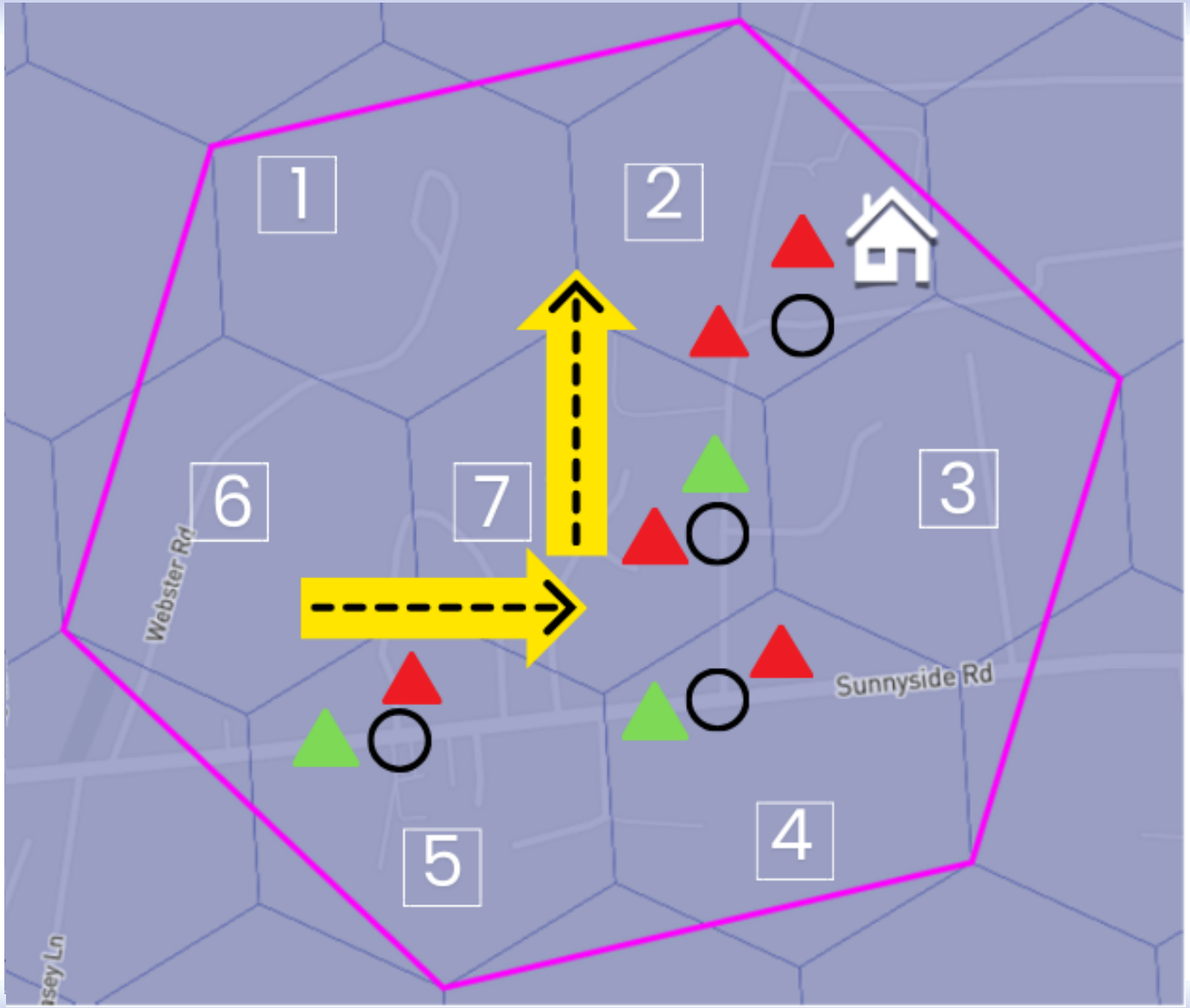
Test ID	Hex-9	Time	Upload
1	2	8:30am	0.5
2	7	8:35am	0.75
3	4	8:42am	3
4	5	8:50am	2



Evening Commute

- We conduct 1 speed test in each of the identified child hex-9s
- The upload components did not meet the 1 Mbps threshold in hex-9s #2, #4, and #5. Hex-9 #7 met the threshold in the afternoon.

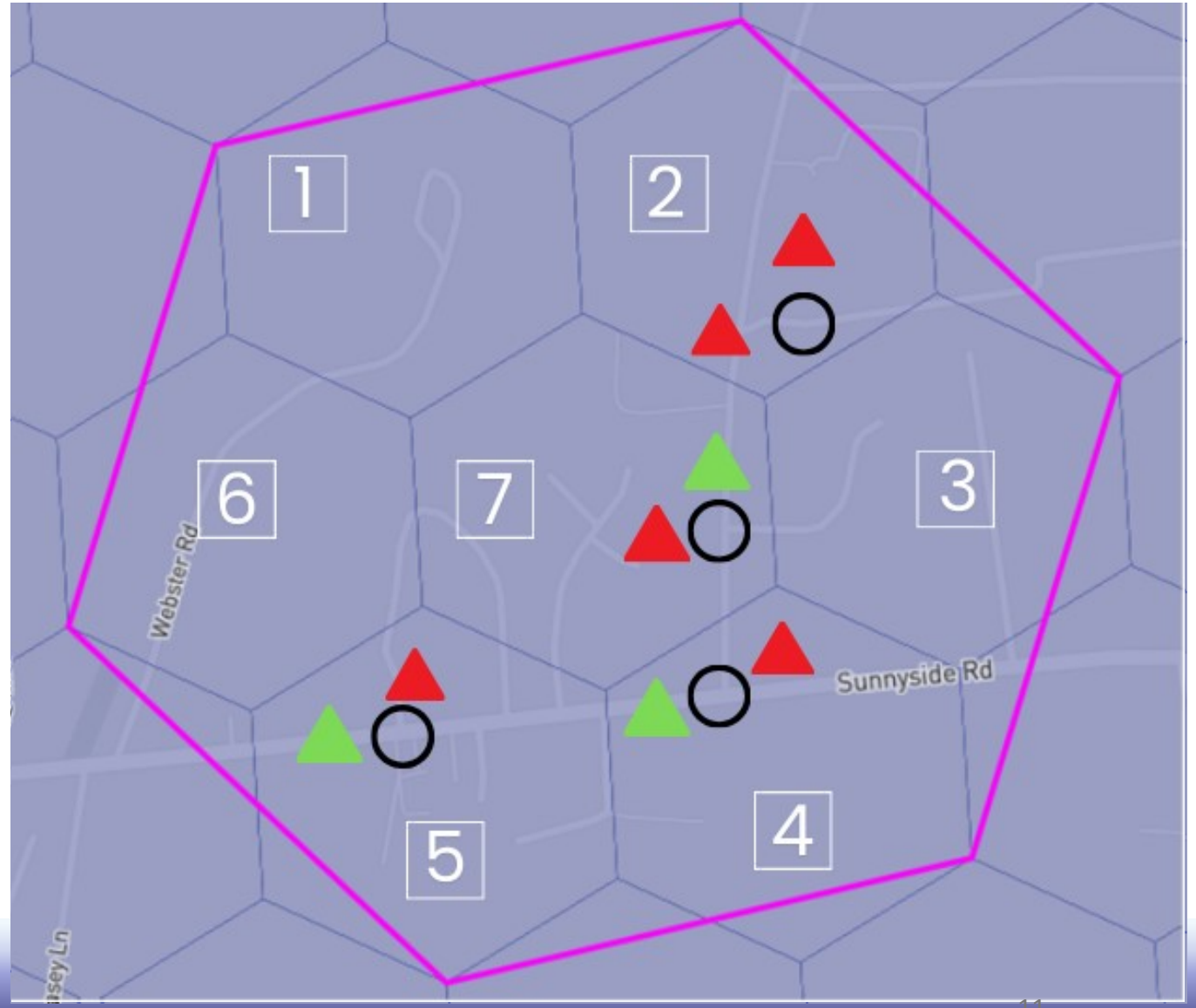
Test ID	Hex-9	Time	Upload
1	2	8:30am	0.5
2	7	8:35am	0.7
3	4	8:42am	3.0
4	5	8:50am	2.0
5	2	6:04pm	0.3
6	7	6:10pm	4.0
7	4	6:15pm	0.8
8	5	6:21pm	0.6



Cognizable Challenge

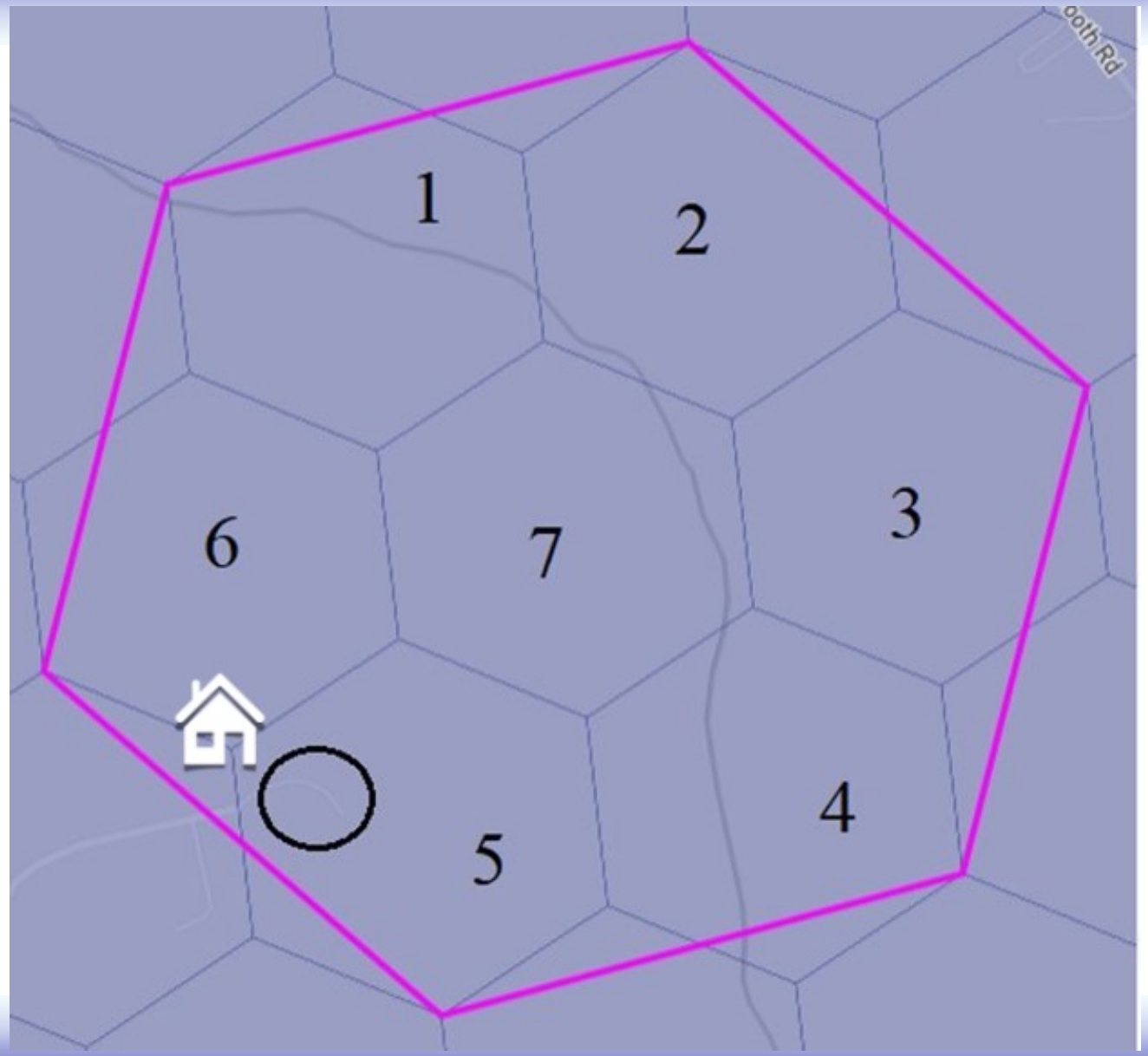
- **Geographic**: 4 hex-9s have at least 2 components with at least 1 negative component
- **Temporal**: First set of 2 negative components (#1 & #2) separated by at least 4 hours from a second set of 2 negative components (#7 & #8)
- **Testing**: With fewer than 20 components, at least 5 must be negative

Test ID	Hex-9	Time	Upload
1	2	8:30am	0.5
2	7	8:35am	0.7
3	4	8:42am	3.0
4	5	8:50am	2.0
5	2	6:04pm	0.3
6	7	6:10pm	4.0
7	4	6:15pm	0.8
8	5	6:21pm	0.6



Testing While on a Walk

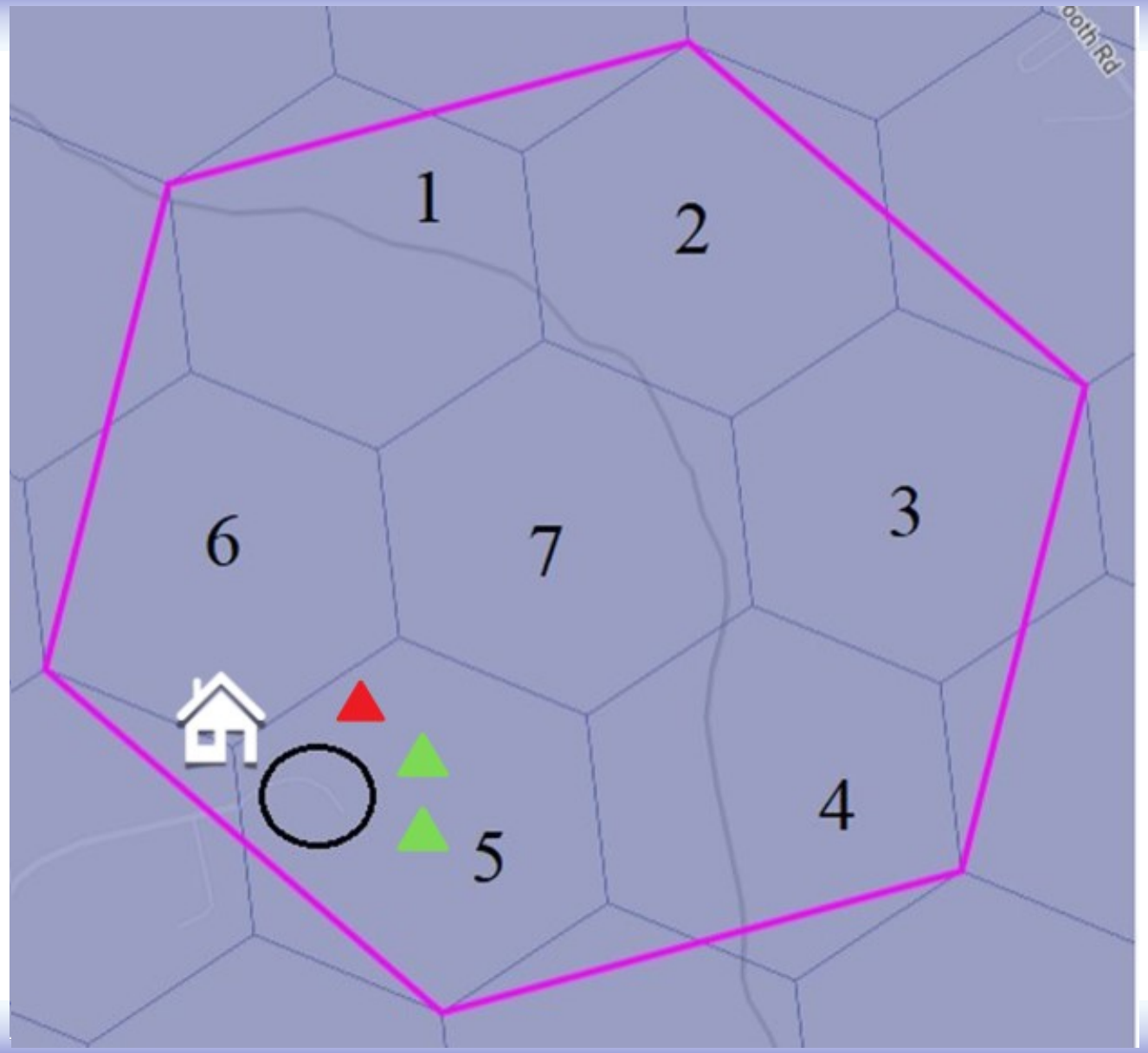
- 5G-NR Outdoor Stationary Mobile
  - 100% coverage at 7/1 Mbps
- 1 Accessible hex-9 → Geographic Threshold is 1



Morning Walk

- We conduct 3 tests in the only accessible hex-9 (#5)
- 2 of the 3 upload components met the 1 Mbps threshold
- Geographic threshold is satisfied

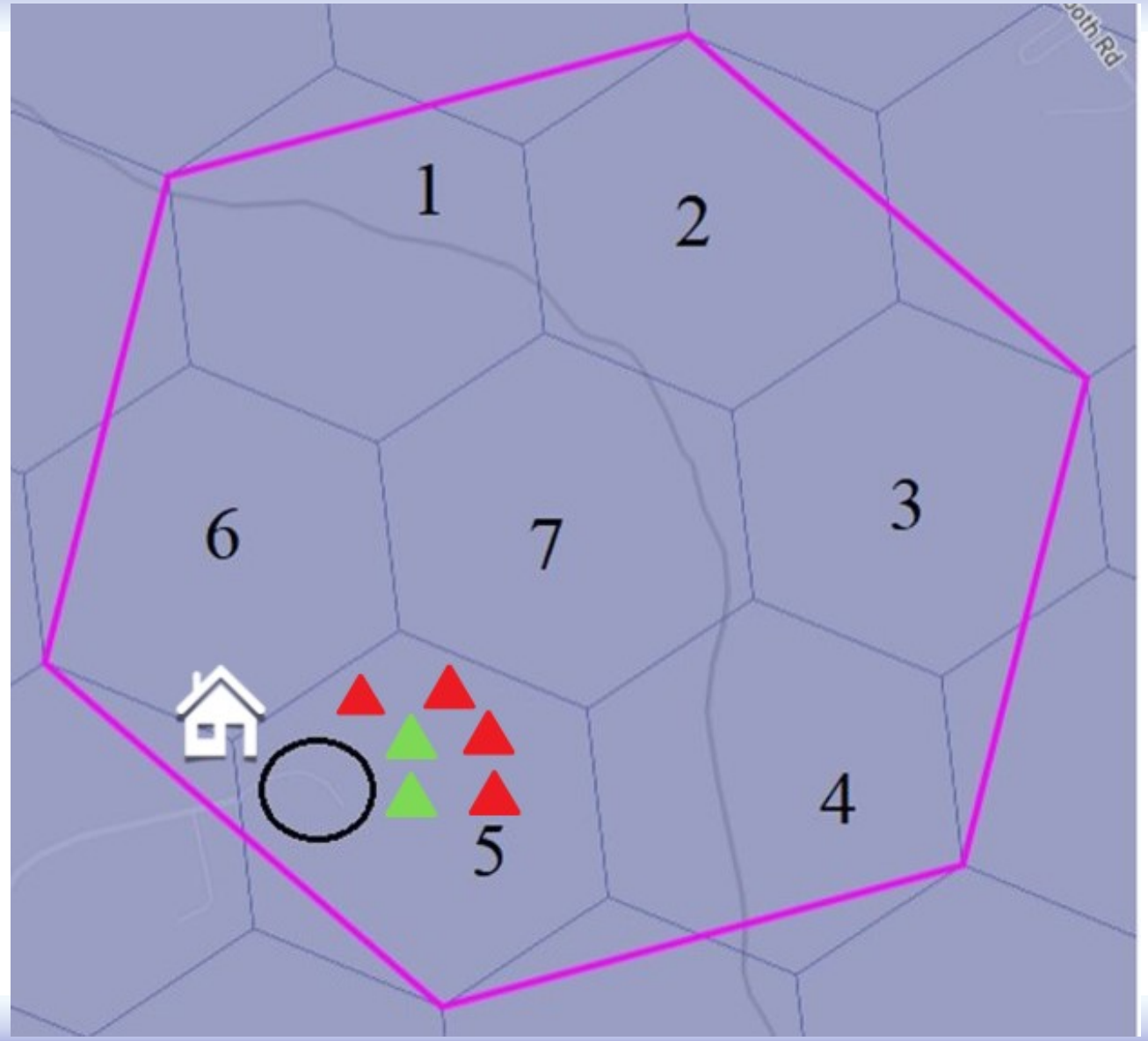
Test ID	Hex-9	Time	Upload
1	5	9:37am	0.5
2	5	9:40am	2.5
3	5	9:44am	3.5



Afternoon Walk

- We conduct 3 more tests in the only accessible hex-9 (#5)
- Overall, 4 of the 6 upload components have not met the 1 Mbps threshold
- Temporal and testing thresholds are not satisfied

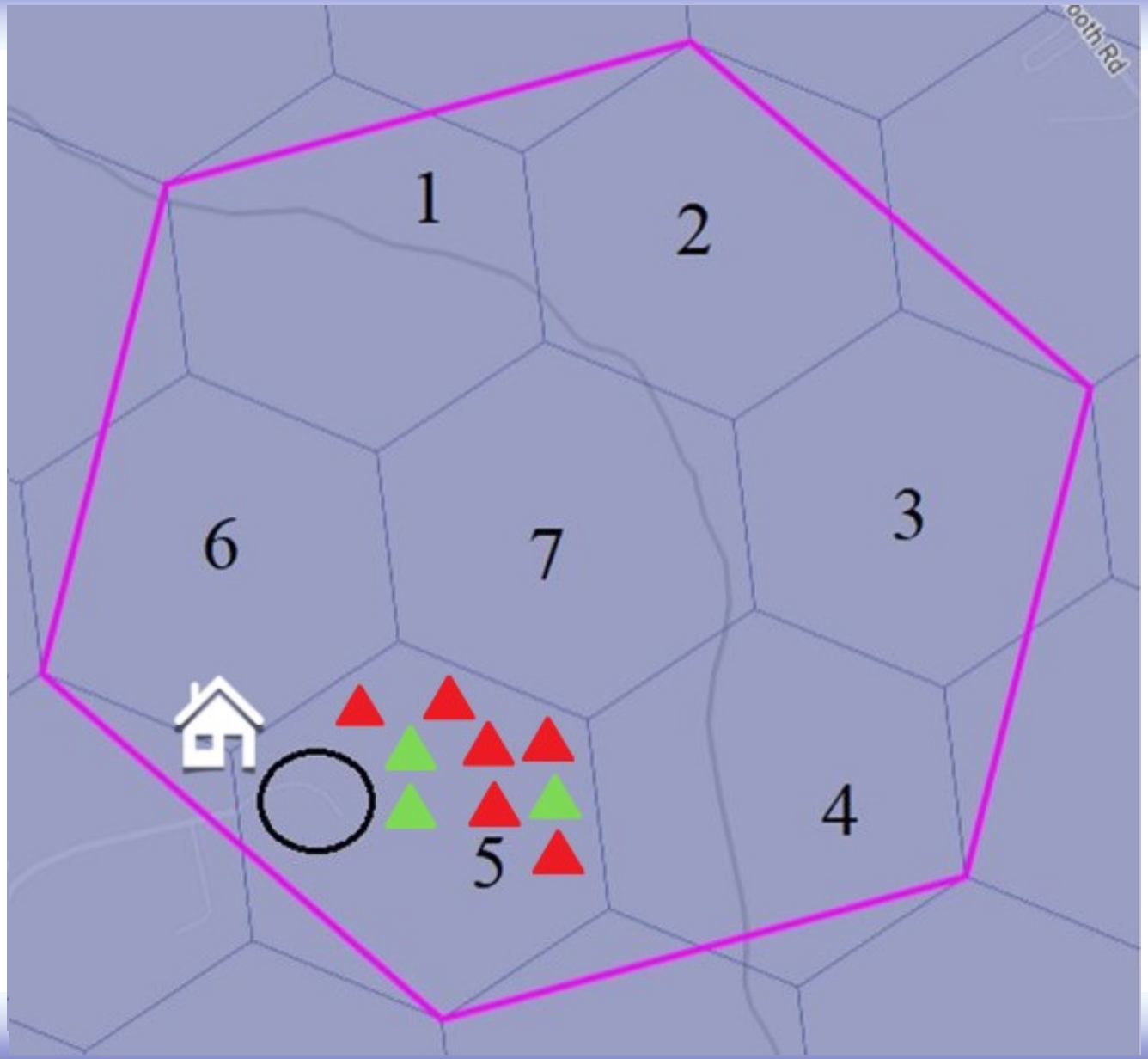
Test ID	Hex-9	Time	Upload
1	5	9:37am	0.5
2	5	9:40am	2.5
3	5	9:44am	3.5
4	5	4:05pm	0.7
5	5	4:07pm	0.6
6	5	4:10pm	0.2



Evening Walk

- Test #7: testing threshold is now satisfied
- Temporal threshold not satisfied.
- Conduct tests #8 (positive) and #9 (negative)
- Temporal threshold is now satisfied

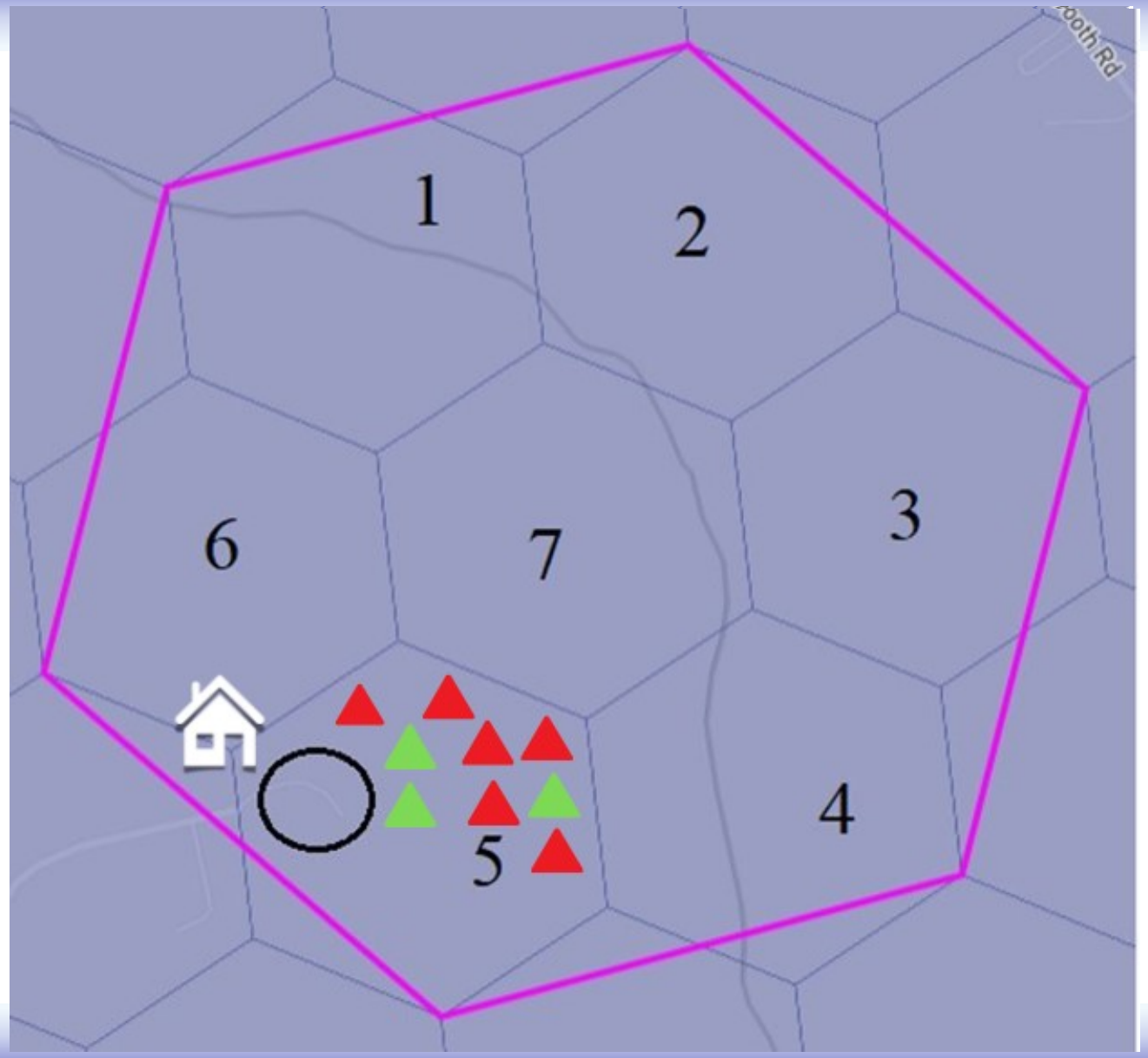
Test ID	Hex-9	Time	Upload
1	5	9:37am	0.5
2	5	9:40am	2.5
3	5	9:44am	3.5
4	5	4:05pm	0.7
5	5	4:07pm	0.6
6	5	4:10pm	0.2
7	5	8:13pm	0.6
8	5	8:15pm	2.1
9	5	8:18pm	0.6



Cognizable Challenge

- **Geographic:** 1 hex-9 has at least 2 components and at least 1 negative component
- **Temporal:** First set of 2 negative components (#1 & #4) separated by at least 4 hours from a second set of 2 negative components (#7 & #9)
- **Testing:** With fewer than 20 components, at least 5 must be negative

Test ID	Hex-9	Time	Upload
1	5	9:37am	0.5
2	5	9:40am	2.5
3	5	9:44am	3.5
4	5	4:05pm	0.7
5	5	4:07pm	0.6
6	5	4:10pm	0.2
7	5	8:13pm	0.6
8	5	8:15pm	2.1
9	5	8:18pm	0.6

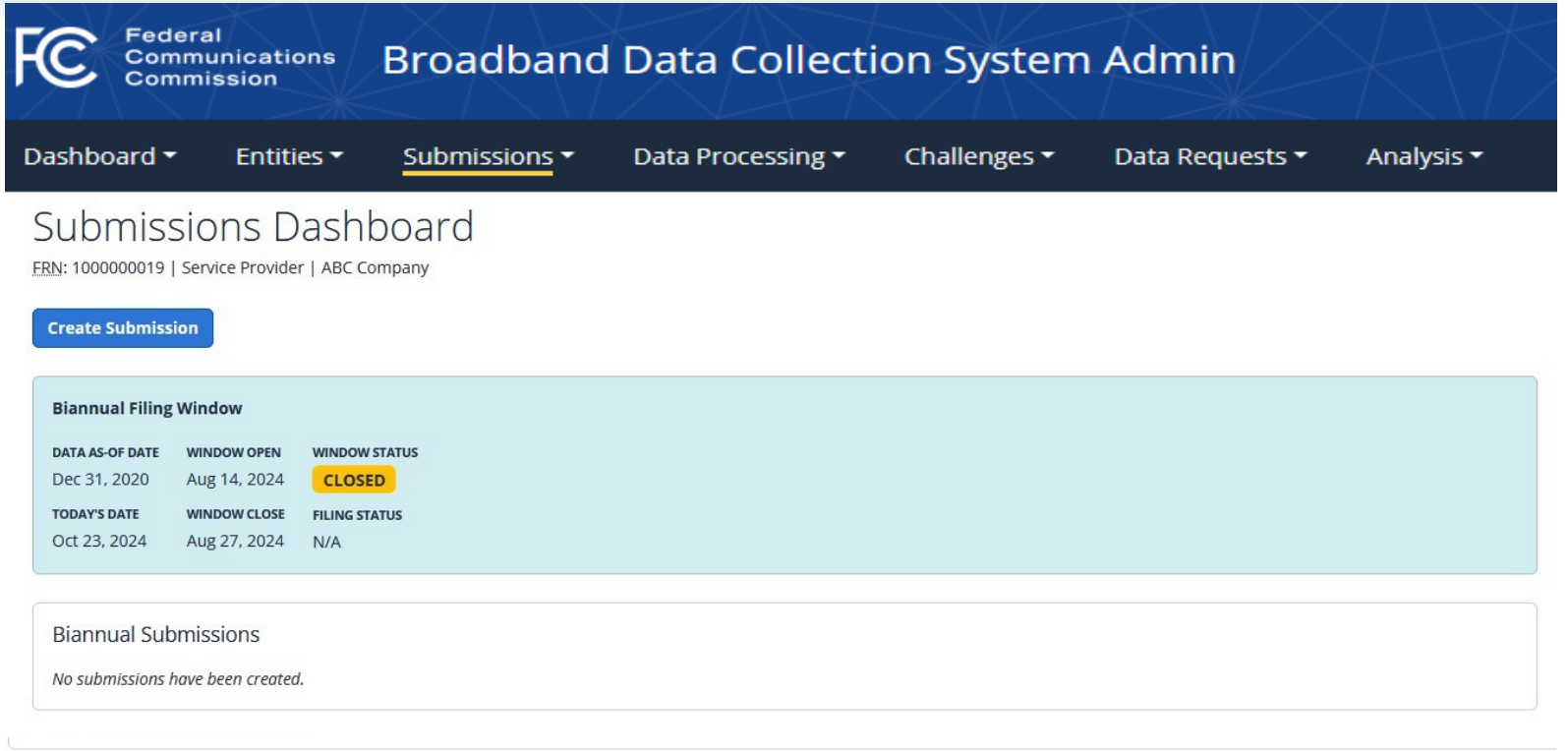


Challenging Hex-7s and Hex-6s

- Challenging a hex-7 (5 km2) requires meeting the 3 thresholds in at least 4 of child hex-8s
  - The challenge to the parent hex-7 creates effectively challenges the 3 hex-8s where hex-8 level cognizable challenges were not created
- Creating a cognizable challenge in 4 hex-7s with the same parent hex-6 (35 km2) creates a challenge to the entire hex-6
  - Each hex-7 requires at least 4 hex-8 challenges so a total of at least 16 hex-8s must be challenged within the same hex-6 to create a hex-6 challenge

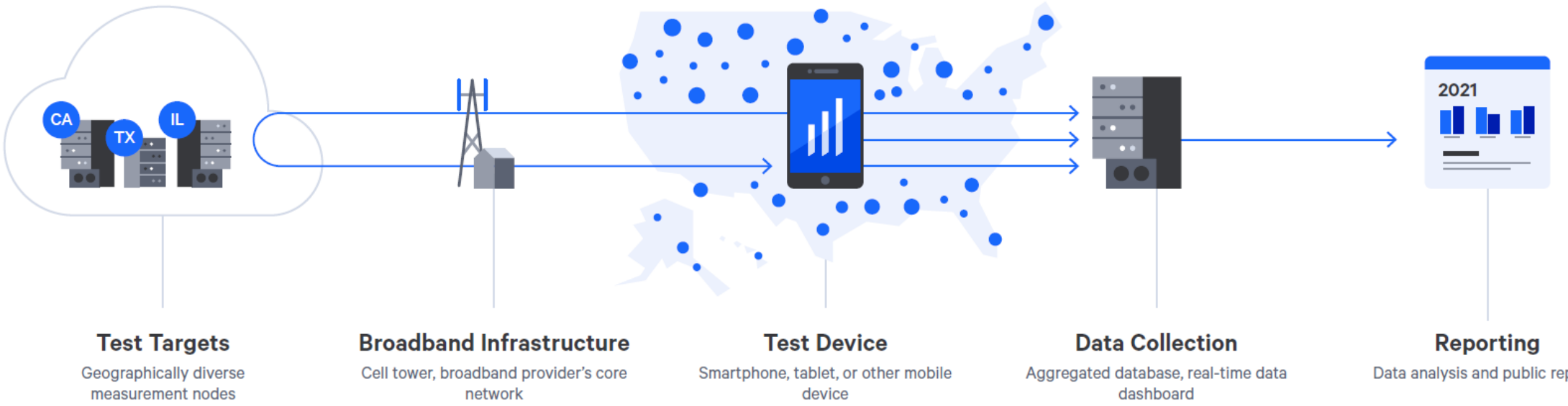
Challenging a Hex-7 Example

Bulk Mobile Challenge Process in the Broadband Data Collection (BDC)



fcc.gov/BroadbandData/resources | help.bdc.fcc.gov

Bulk Mobile Challenge: Govt., Providers, and 3rd Party Challengers



- Governmental, mobile broadband service providers, and other third-party entity challengers may use their own hardware and software to collect speed test data for the mobile challenge process so long as:
  - the data include a defined set of metrics, and
  - challengers submit a full description of the methodology used

Bulk Mobile Challenge: Providers Responding to Challenges

- Challengers may use their own hardware and software to collect on-the-ground test data (using the Android system) to respond to challenges if
  - these incorporate the OET-approved test methodology and required metric collection,
  - these data must be described on submission, and
  - be certified by a qualified engineer or officer.
- The Bulk Mobile Challenge process potentially allows for wider geographic areas to be challenged (e.g., hexagons 6 and 7 as opposed to the smaller hexagon 8).

Bulk Mobile Challenge: Description of Methodology & Specs

Entity Mobile Testing Methodology Data

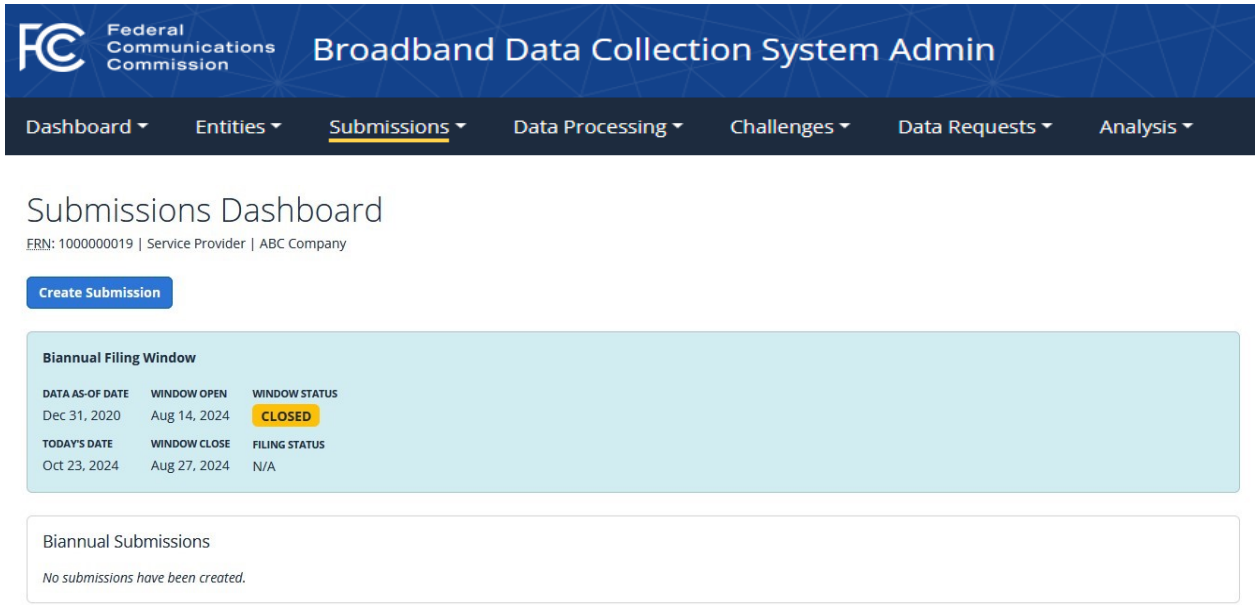
Filers are required to enter a description of the testing methodology that was used to collect the Entity Mobile Crowdsource/Challenge Information.

Field	Data Type	Example	Description / Notes
Methodology ID	String	Acme Wireless Drive Test – Team B	Unique name identifying the testing methodology used to collect the mobile speed test data
Narrative	File Upload		Narrative explanation of the methodology used to conduct the mobile speed tests.

- Bulk Challengers must provide a narrative overview of the testing solution, including a description of the test methodology and a URL link to the test solution product (if available).
- They should also include, if available, product images, sample reports from test campaigns conducted using this product, and any other information that is useful in determining the product test and measurement capabilities.

Bulk Mobile Challenge: Submitting Data in the BDC System

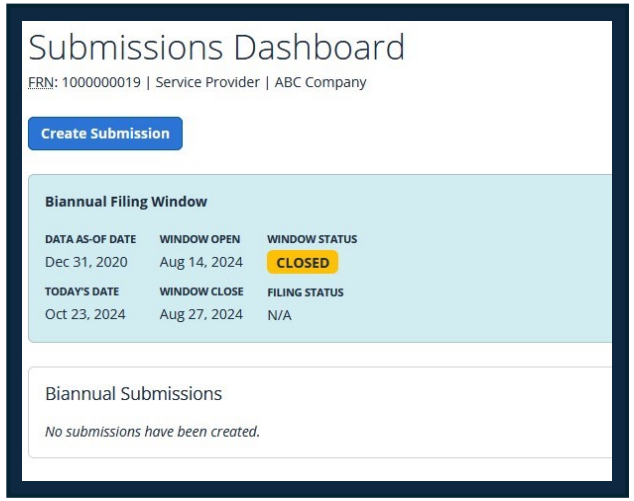
- Login to the BDC System. Then go to submissions dashboard and select: “Create Submission” → “Crowdsource/Challenge” → “Bulk Mobile Challenge” → click “Create Submission.”
- Upload a file that conforms to the specifications detailed in the BDC Help Article, *Hardware and Software Requirements for Collecting Bulk Mobile Speed Tests*.

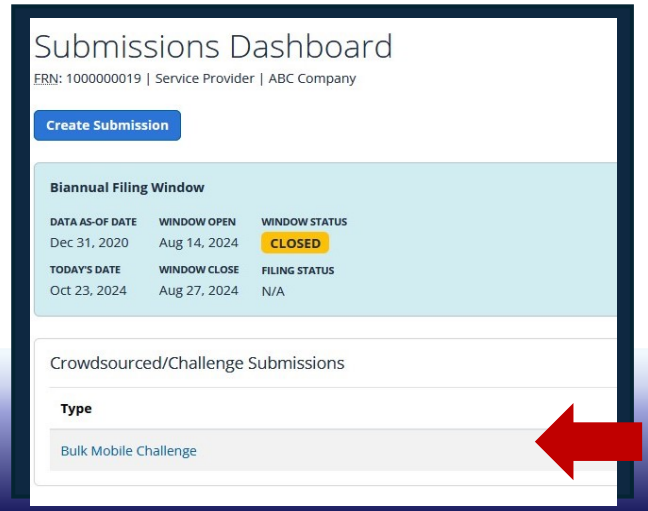


[Data Specifications for Mobile Speed Test Data]

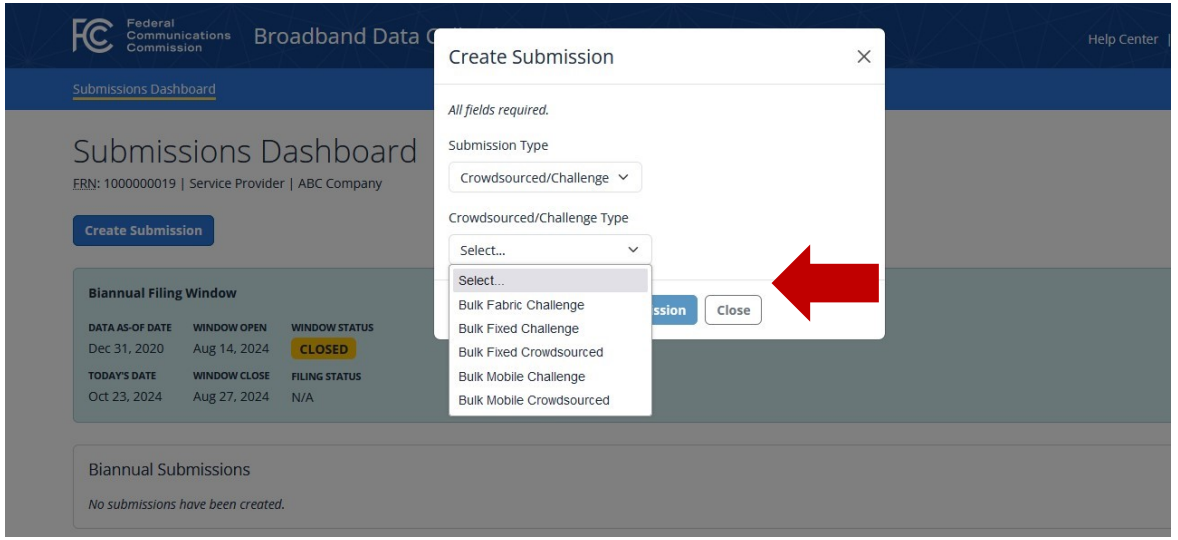
Bulk Mobile Challenge: Submitting Data in the BDC System

Step 1 **Create** Submission





Step 2 **Select** "Bulk Mobile Challenge" in drop down



Step 3

Upload data by clicking "Bulk Mobile Challenge"

BDC Help Video: ***How to File Bulk Mobile Availability Challenge Data in the BDCSystem***

Sources for the Bulk Mobile Challenge Process

BDC Help Center at help.bdc.fcc.gov

- Bulk Mobile Challenge Process Overview
- Mobile Wireless Broadband Availability Challenge Process for Governmental Entities and Third Parties
- How to File Bulk Mobile Availability Challenge Data in the BDC System
- Speed Test Data for Bulk Mobile Challenges
- Hardware and Software Requirements for Collecting Bulk Mobile Speed Tests
- An Overview for Providers Responding to Mobile Wireless Coverage Challenges
- How Providers Should Respond to Mobile Wireless Challenges in the BDC System

BDC Resources & Releases:
fcc.gov/BroadbandData/resources

- Bulk Mobile Challenge Public Notice (PN)
- BDC Mobile Technical Requirements Order (MTRO), paras. 66-70,
- BDC Third Report & Order (3rd R&O)
- Data Specifications for Mobile Speed Test Data
- 47 CFR § 1.7006(c)(1); 47 CFR § 1.7006(f)(1)