

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Establishing the Digital Opportunity Data
Collection

WC Docket No. 19-195

Modernizing the FCC Form 477 Data Program

WC Docket No. 11-10

COMMENTS OF VERIZON¹

Verizon supports the Commission’s efforts to obtain useful and reliable data on broadband coverage. Both initial shapefile polygon reporting and development of a highly accurate location fabric will significantly help the Commission better understand where broadband is currently deployed – and where it is not. Consumers today have ever-increasing access to reliable internet at ever-higher speeds, often from multiple providers.² But there’s more to be done to continue to close the digital divide. More accurate and granular information will allow the Commission to better focus its efforts to expand broadband service to those places where it is lacking. We therefore support the Commission’s efforts to update its data collection here, just as we have supported USTelecom’s work to pilot a detailed location fabric.³

¹ The Verizon companies participating in this filing are the regulated, wholly owned subsidiaries of Verizon Communications Inc.

² See, e.g., FCC, Indus. Analysis Div., Off. of Econ. & Analytics, *Internet Access Services: Status as of December 31, 2017*, figs. 3, 4, 8 (Aug. 2019); 2019 Broadband Deployment Report, *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, 2019 Broadband Deployment Report, 34 FCC Rcd 3857, ¶¶ 32-39 (2019) (“*Broadband Progress Report*”).

³ See, e.g., USTelecom, *Broadband Mapping Initiative: Proof of Concept*, WC Docket Nos. 19-195 *et al.*, at 5 (Aug. 20, 2019) (“*Broadband Mapping Initiative*”).

As part of its process in updating its requirements, we also encourage the Commission to ensure it maximizes the value of its revised collection.⁴ Thus, the Commission should be careful not to introduce unnecessary requirements that will detract from the ultimate goal of collecting useful data in an efficient manner. The Commission should also carefully consider the extent to which additional contemplated processes will provide useful information that merits the additional burdens they impose on providers.

I. THE COMMISSION SHOULD ADOPT FLEXIBLE STANDARDS FOR BROADBAND REPORTING

A. The Commission’s Rules Should Allow Providers To Use Existing Systems and Network Design in Broadband Mapping

Verizon supports the Commission’s efforts to develop more accurate and reliable broadband maps through the submission of broadband coverage polygons.⁵ In asking for these polygons, however, the Commission should not impose a one-size-fits-all prescriptive rule dictating how they are created. As the Commission recognizes, determining the area that a particular broadband provider services “is highly idiosyncratic and determined by multiple factors.”⁶ Providers should thus be permitted to rely on their own services, network designs, and internal data to produce accurate and reliable polygon maps of service coverage, rather than try to apply an imposed framework that does not align with how their systems are designed, or how they determine their own coverage areas for their own business purposes.

⁴ As the Commission has noted, since 2000 it has collected increasing amounts of data from providers through Form 477. *See* Report and Order and Second Further Notice of Proposed Rulemaking, *Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program*, WC Docket Nos. 19-195 & 11-10, FCC 19-79, ¶¶ 2-4 (rel. Aug. 6, 2019) (“*FNPRM*”).

⁵ *See id.* ¶¶ 12-13.

⁶ *See id.* ¶ 79.

Thus, while requiring all providers to submit shapefiles mapping their coverage, the Commission should give providers flexibility in how they create broadband coverage polygons so as to most accurately map their own footprints. For example, providers should be permitted to develop shapefile polygons based on either service locations *or* network topology; creating shapefiles based on service locations may better suit some technology deployments. And a provider may already have mapped its service territory and determined the more appropriate methodology to measure and reflect its service area. The Commission therefore should not impose a one-size-fits-all prescriptive rule for creating broadband coverage polygons.

The same principles should guide any rules the Commission establishes regarding buffers around network facilities or service locations. Buffers encompass ranges along boundaries that ensure more accurate and smoother reporting of covered areas, especially when the underlying methods used to measure service availability are necessarily imprecise, as is often the case with geocoding.⁷ The Commission should allow providers to use the same reasonable buffers that they already use internally for commercial purposes rather than imposing a one-size-fits-all approach. The buffers that providers rely on when making their own internal coverage maps serve similar purposes and therefore serve the Commission's goals as well. Rather than establish a potentially burdensome and restrictive single buffer rule that may conflict with a provider's existing processes, the Commission could achieve similar results by setting a broad range of acceptable buffers, such as up to several hundred meters, and requiring the use of the narrower of the provider's own buffers or the outside end of the range.

⁷ See *Broadband Mapping Initiative* at 5 (showing significant variance in service location geocoding data, particularly in rural areas).

The design for the online portal to accept polygons from fixed providers, developed by the Commission and the Universal Service Administrative Company (“USAC”), should prioritize ease of use for providers.⁸ The easier it is for providers to submit the required uploads, and to review prior filings, the fewer mistakes providers will make when entering submissions, which can result in a more accurate and efficient process.

B. The Commission Should Not Impose Latency Reporting Requirements

The Commission should not require fixed providers to submit latency data as a part of their broadband coverage polygons.⁹ The Commission already requires broadband providers to disclose both “expected and actual . . . latency, and the suitability of the service for real-time applications.”¹⁰ Providers typically disclose this information on their public websites. For example, Verizon discloses the median latency for each of its tiers of Fios and DSL service.¹¹ Obtaining more granular latency data to go along with the coverage polygons will impose significant burdens on providers and will provide little useful information beyond what already is available. And, as the Commission already notes, such a requirement would raise difficult technical questions about how and where providers should measure latency,¹² particularly since latency may vary with the specific applications or services that consumers use.¹³

⁸ See *FNPRM* ¶ 77.

⁹ See *id.* ¶ 81.

¹⁰ Declaratory Ruling, Report and Order, and Order, *Restoring Internet Freedom*, 33 FCC Rcd 311, ¶ 222 (2018).

¹¹ See, e.g., Verizon, *Network Performance* (2019), <https://www.verizon.com/about/our-company/network-performance>.

¹² See *FNPRM* ¶ 81.

¹³ Further, while certain universal service program recipients are required to conduct regular testing of the speed and latency of their services in supported areas, that requirement derives from the need to verify that supported services meet the agency’s universal service program rules; it would be superfluous and burdensome to require any similar testing or

II. THE COMMISSION SHOULD APPROACH CROWDSOURCED DATA CAUTIOUSLY TO PROTECT PROVIDERS FROM NEEDLESS BURDENS AND HARASSMENT

The Commission intends to collect information through crowdsourcing by asking USAC to create an online portal through which members of the public can submit their personal knowledge about service coverage.¹⁴ Such public input from actual broadband customers and potential customers can improve the accuracy of the coverage maps or identify inadvertent errors. But opening the process to public data can also introduce noise and complexity – whether from well-meaning or from mal-intentioned individuals or entities – that can be extremely difficult to separate from useful submissions. For example, fake business listings have sprung up all over Google Maps by pranksters or fraudsters taking advantage of the crowdsourcing model.¹⁵ And the Commission itself is looking for ways to protect the integrity of its public comment filing system against fraudulent or spam comments.¹⁶ For these reasons, any reliance on crowdsourced data must be carefully calibrated both to promote greater accuracy and to protect providers from overwhelming burdens of sifting the wheat from the chaff.

Public feedback should be limited to the narrow purpose of improving the accuracy of service maps. Public questions about broadband coverage under this feedback process are different than informal customer complaints, and the Commission should neither meld the two nor develop a surrogate process for public feedback that duplicates the existing informal

reporting outside of such areas, or by unsubsidized providers, especially given the availability of other sources of this data. *See id.*

¹⁴ *Id.* ¶¶ 18, 88.

¹⁵ *See, e.g.,* Rob Copeland & Katherine Bindley, *Millions of Business Listings on Google Maps Are Fake—and Google Profits*, Wall St. J. (June 20, 2019); Jane C. Hu, *The Pin Is Mightier*, Slate (Aug. 23, 2019).

¹⁶ *See* Jonathan Make, *FCC Filing System Changes May Be Big, Include Authentication or Spam Reduction*, Comm. Daily, Sept. 17, 2019, at 5.

complaint process.¹⁷ Opening a public comment portal will allow *anyone* to submit a challenge to a provider’s coverage map at virtually no cost, especially if the online form does not have safeguards to prevent automated submissions. While that is good for the well-intentioned filer, the Commission correctly recognizes that there could be “bad-faith or malicious challenges to coverage data” and should seek out practical measures to protect the integrity of the Commission’s data and resources, as well as those of providers.¹⁸ To ensure challenges are made in good faith, the Commission suggested that filers certify that they have sought out but did not receive service.¹⁹ This is a good first step. Providers cannot easily investigate the validity of public challenges from people who are not authenticated customers and allegedly were unable to purchase service because they lack any customer connection with the submitter. However, this proposal does not go far enough to ensure that the Commission and providers are not bogged down – or data corrupted – from meritless public challenges. The Commission should consider other ways to ensure that its process to make its maps more informed does not become consumed by bad data or open the door to unnecessary or cumbersome procedures.

Crowdsourcing that focuses on identifying trends and trouble-spotting, rather than addressing every unique claim, can be useful and avoid the burdens on providers and USAC of the inevitable clutter of managing an anonymous internet submission process with few filters. Provider responses to crowdsourcing should be systematized and simple. While providers currently respond to the Commission’s informal customer complaints with letter responses on an ongoing basis, the Commission should not impose similar obligations here, where a different

¹⁷ The Commission and USAC can play a useful role by providing clear boundaries between the two processes and by educating users.

¹⁸ *FNPRM* ¶ 97.

¹⁹ *See id.* ¶ 91.

standard and expectation for the level of responsiveness to public challenges to these maps is appropriate.²⁰ For example, NCTA’s proposal helpfully would permit providers to submit corrections at the next filing opportunity,²¹ instead of immediately, so that map corrections and responses to challenges are synchronized. Any carrier response process, if more than updating the map at the next interval, should require no more than a standardized update alert through the Commission and USAC’s electronic system. Requiring individualized responses will unduly complicate the process and will not materially improve the development of accurate coverage maps.

Rather than developing a new and complex dispute process, the Commission should direct USAC to maintain data on locations subject to a dispute between a public challenger and a provider. USAC should be focused on improving the map and collection process and is ill-suited to overseeing more than a straightforward electronic administrative process.

III. THE COMMISSION SHOULD INTEGRATE LOCATION-SPECIFIC DATA WITH BROADBAND COVERAGE REPORTED BY PROVIDERS

At a minimum, the Commission should support and integrate the Broadband Mapping Coalition’s Broadband Serviceable Location Fabric (“Location Fabric”) with the coverage polygons collected through the Digital Opportunity Data Collection.²² The Location Fabric is designed to record serviceable locations at a granular level by drawing from multiple data sources.²³ USTelecom’s proposals for a Location Fabric are appropriately designed to improve

²⁰ See *id.* ¶ 95.

²¹ See *id.* ¶ 93.

²² See *id.* ¶¶ 99, 110.

²³ USTelecom July 1, 2019 *Ex Parte* Letter at 2-3.

the accuracy of location reporting and will facilitate the identification of unserved areas.²⁴ The location-specific data the Location Fabric will produce should be mapped with the coverage polygons submitted by providers through the Digital Opportunity Data Collection requirements, and the Commission is right to propose integrating them.²⁵ The combination should not impose any additional burdens on providers, and it will increase the precision of and provide useful context for the coverage maps.

The granularity of the location database will also improve the ability of carriers to anticipate their obligations if they bid for and accept Universal Service funding. To that end, the Commission should ensure that carriers that bid on Universal Service funding can easily access the Location Fabric.²⁶ This way, they can determine the location of unserved homes and accurately report the services that they deliver using Universal Service funding.

IV. THE COMMISSION SHOULD MAKE TARGETED CHANGES TO THE MOBILE SERVICE DATA REQUIREMENTS

Generating mobile broadband coverage maps is a highly complex task. As the Commission acknowledges in the *FNPRM*, “many factors can affect a user’s experience, making it difficult to develop a coverage map that provides the exact mobile coverage and speed that a consumer experiences.”²⁷ A propagation model is just that – a model. No matter how granular or sophisticated the model, it cannot be expected to predict actual coverage perfectly in all locations and at all times. Moreover, measuring coverage for large areas through on-the-ground testing is impractical because statistically significant results can be obtained only by performing

²⁴ See *id.*; USTelecom May 28, 2019 *Ex Parte* Letter at 2; USTelecom March 21, 2019 *Ex Parte* Letter at 3.

²⁵ See *FNPRM* ¶ 110.

²⁶ See *id.* ¶ 111.

²⁷ *Id.* ¶ 112.

a very large number of measurements under controlled conditions. Given the inherent variability of mobile network performance, it is not possible to eliminate all differences between coverage maps based on propagation models, no matter how sophisticated, and actual user experience.²⁸

The Commission can, however, address most of the concerns that have been expressed about the Form 477 mobile broadband deployment data simply by adopting standardized modeling parameters for 4G LTE propagation models (but not for 5G, for which the adoption of standardized parameters is premature).²⁹ For example, the Commission could require all carriers to submit coverage maps that reflect the modeling parameters that CTIA recommended in the Mobility Fund proceeding: 5 Mbps download speed, uplink sufficient to support VoLTE, a 90 percent cell edge probability, and a 50 percent loading factor.³⁰ These parameters are more robust than those adopted by the Commission in the Mobility Fund proceeding, and thus should make it less likely that actual user experience falls short of that predicted by the model.³¹

The Commission should not, however, specify a standardized signal strength level. As the Commission found in the *MF-II Challenge Process Order* when it declined to set a signal strength parameter because of “the differing technical characteristics of service providers’ LTE

²⁸ *Id.* ¶ 112 (noting that “measuring performance on mobile broadband networks is inherently variable”).

²⁹ *See id.* ¶¶ 113-117. The Commission will be in a better position to adopt standardized parameters for 5G modeling when more carriers have gained more experience with 5G deployments.

³⁰ CTIA Comments at 11-12, WC Docket Nos. 10-90 & 10-208 (Apr. 26, 2017).

³¹ Discrepancies between modeled and actual user experience run in both directions – sometimes a model will predict coverage or performance characteristics that exceed user experiences, and sometimes the user experience will exceed predicted performance. Adoption of more robust parameters reduces the likelihood of the former. In the *MF-II Challenge Process Order*, the Commission adopted modeling parameters that reflected its “priority of directing our limited universal service funds on areas most in need of support.” Order on Reconsideration and Second Report and Order, *Connect America Fund; Universal Service Reform – Mobility Fund*, 32 FCC Rcd 6282, ¶ 36 (2017) (“*MF-II Challenge Process Order*”).

deployments,” the cell edge speed requirement “subsumes a specific signal strength value depending on specific operating signal bandwidth and the network deployment configurations.”³²

The Commission can accomplish two important objectives by adopting standardized modeling parameters. First, standardized parameters will ensure greater consistency among different carriers’ maps, allowing the Commission to validly compare and aggregate different carriers’ reported coverage areas. Second, and equally important, the Commission can address most of the concerns about the perceived divergence between Form 477 submissions and consumers’ experience by adopting modeling parameters that correspond to high-quality coverage, e.g., 5 Mbps downstream speed at a 90 percent cell-edge probability, rather than marginal coverage.

The Commission should not go further and require “mutual use (by the Commission and stakeholders) of a standardized RF propagation prediction model.”³³ As an initial matter, that approach would yield less reliable maps because the common model would not have the benefit of the substantial investment that each carrier has made in calibrating its own model. Verizon’s model, for example, has been calibrated for many different kinds of terrain using measurements from drive tests. Moreover, the common model approach would impose substantial costs and burdens on the Commission and carriers. Every carrier would have to incur the substantial cost of procuring and operating a second model in addition to the model it uses in the normal course of business. If the Commission ran the common model itself, (1) the Commission would have to incur the cost of procuring the model and the technical expertise and data processing capacity required to run the model; and (2) carriers would have to provide – and the Commission would

³² *Id.* ¶ 40.

³³ *FNPRM* ¶ 116.

have to safeguard – highly detailed and highly confidential information about carrier networks on an ongoing basis.

Because the adoption of standardized parameters would be sufficient to address the primary concerns about the Form 477 data, the Commission should not adopt any of the more complex and burdensome approaches discussed in the *FNPRM*. *First*, the Commission should not adopt its open-ended proposal to require carriers to submit within 30 days any network infrastructure information requested by staff, including the location of cell sites and information about all transmit antennas at each cell site, “to allow for verification of the accuracy of providers’ broadband data.”³⁴ Carriers do not publicly disclose such infrastructure information and, even if the Commission adopts its proposal to treat the submitted information as highly confidential,³⁵ the risk of inadvertent disclosure of a complete database of a carrier’s network infrastructure raises significant network security concerns.

Second, the Commission should not require carriers to “supplement” their submissions with “on the ground” data such as drive test measurements.³⁶ It would be impossible – and prohibitively expensive – for a carrier to drive test its entire network every six months. Verizon conducts drive tests in a more targeted manner to calibrate its propagation model and to confirm the accuracy of the model.

The Commission could obtain and review third-party sources of test data, including third-party structured sample data or crowdsourced data, with appropriate caveats.³⁷ For example, it would be reasonable for the Commission to *supplement* carriers’ Form 477 submissions with

³⁴ *Id.* ¶¶ 119-120.

³⁵ *Id.* ¶ 120.

³⁶ *Id.* ¶¶ 121-122.

³⁷ *See id.* ¶¶ 123-126.

data from third-party sources, as it did in the most recent *Communications Marketplace Report*³⁸ and *Broadband Progress Report*,³⁹ provided that the Commission acknowledges the limitations of crowdsourced data in particular.⁴⁰

But the Commission cannot validly use crowdsourced data to “validate” carriers’ Form 477 mobile broadband submissions.⁴¹ As the Commission recognizes in the *FNPRM*, crowdsourced data is not collected under controlled conditions or in a statistically significant manner.⁴² Whereas, for example, propagation models typically assume a user who is outdoors and stationary, crowdsourced data also includes speed tests initiated by users who are indoors or in a vehicle moving at highway speeds; those users will measure slower speeds than a stationary outdoor user. Given the limitations of crowdsourced data, the Commission should use third-party crowdsourced data only to supplement the Form 477 data and should not devote its limited resources to expanding use of its own crowdsourcing application.

The Commission was right not to require providers to report prepaid subscribers at the census tract level by using primary place of use.⁴³ As CTIA has explained, primary place of use is inapplicable under the current tax and sale system for prepaid users.⁴⁴ If the Commission

³⁸ Report, *Communications Marketplace Report*, 33 FCC Rcd 12558, ¶¶ 25-28 (2018) (“*Communications Marketplace Report*”).

³⁹ *Broadband Progress Report* ¶¶ 29-30.

⁴⁰ See Twentieth Report, *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, 32 FCC Rcd 8968, ¶¶ 88-89 (2017).

⁴¹ See *FNPRM* ¶ 123.

⁴² *Id.* ¶¶ 123-124.

⁴³ See *id.* ¶¶ 64, 134.

⁴⁴ See *id.* ¶ 134; CTIA July 24, 2019 *Ex Parte* Letter at 2-3.

determines that data other than NPA-NXX is required, the Commission should give providers ample flexibility to apply location information to prepaid subscriber data.

V. THE COMMISSION SHOULD REDUCE REDUNDANCIES IN THE INFORMATION THAT PROVIDERS ARE REQUIRED TO REPORT

The Commission should eliminate largely duplicative Form 477 requirements that overlap with the Digital Opportunity Data Collection requirements when the new data collection begins.⁴⁵ Producing highly granular service availability in census block form provides little additional information beyond what will be in the Digital Opportunity Data Collection, but requires additional data, staff processing, and review efforts. Nor will information be lost, since census boundaries can be layered onto the maps created through the Digital Opportunity Data Collection.

The Commission should consider the overall breadth of information now requested from providers and make efforts, where possible, to streamline its requirements. The Commission's requests for ever more detailed information about service availability data have not yet been offset by reductions in requests for confidential subscriber information, even though both pools of information can be used to reach many of the same conclusions about service coverage. Providers could aggregate data to reduce the burdens of some reports without losing value. For example, the Commission could simplify subscriber reporting by requesting reports only of the total number of subscribers at the census tract level, permitting providers to report at the county level the extended details on how many subscribers the provider serves at each speed tier without also having to report details on how many subscribers of each speed are in each census tract.

⁴⁵ See *FNPRM* ¶ 135.

CONCLUSION

For the foregoing reasons, the Commission should modify its Digital Opportunity Data Collection and Form 477 Data Program in ways that improve the Commission’s analytical capabilities without overburdening service providers.

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