

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

In the Matter of)	
)	
)	
Wireless E911 Location Accuracy)	PS Docket No. 07-114
Requirements)	
)	
)	

VERIZON PETITION FOR WAIVER

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whether through the OS vendors' own solutions or by enabling the use of third party solutions. And granting the requested waiver furthers the public interest in the long-term availability of robust support across the industry ecosystem for high-quality emergency location services. There is thus good cause for grant of Verizon's requested waiver relief.

II. SUMMARY

Verizon faces unique and unusual factual circumstances that make full compliance with the rule by the existing April 3, 2021 deadline infeasible. First, Verizon's compliance status is dependent on the device operating system owners Apple and Google ("OS vendors") for development or adoption of compliant solutions. As of today and despite much progress, it is not clear whether those solutions will meet the Commission's accuracy standard by the April deadline due to the impact of the COVID-19 pandemic on testing activities. Second, the official CTIA Test Bed is unavailable for the necessary compliance testing until later in 2021, again, due to public health concerns around COVID-19. So even if Verizon's internal testing demonstrates *de facto* compliance by April 3, Verizon will not legally be able to certify compliance under the rules until testing is validated in the CTIA Test Bed, which is not scheduled to re-start until September 2021 at the earliest.

This Petition shows the Commission has good cause to grant Verizon's limited request for waiver. Verizon diligently solicited and encouraged support for z-axis solutions from OS vendors and third party solution vendors for years before the deadline. And Verizon and the OS vendors have made significant progress toward availability of compliant solutions. But given that Apple's iPhones make up more than half of Verizon's base of smartphones, and due to its policy of not supporting third party z-axis solutions for the reasons explained below, the OS vendors' solutions are the only ones that would enable Verizon to attain compliance. And the CTIA Test

Bed, which is closed until at least September 2021 due to COVID-19, is the only mechanism by which Verizon can legally certify compliance with that deadline on June 2, 2021.

Verizon has been working on compliance with the Commission's vertical location accuracy requirements for years. Verizon originally sought to meet the requirements through the use of the National Emergency Address Database (NEAD) to deliver dispatchable location information to PSAPs for 911 calls, contributing information for millions of Wi-Fi access points and deploying the capability in its network and handset specifications. But after years of work and millions of dollars in investment, the NEAD proved to be not viable due to lack of support from OS vendors and other Wi-Fi providers.

Once the NEAD approach became no longer viable, Verizon redoubled its already ongoing z-axis implementation efforts. Verizon worked with relevant stakeholders to test and evaluate different solutions to meet the z-axis milestones. Verizon evaluated solutions from NextNav and Polaris (which are dependent for implementation on the device OS vendors' acquiescence), in addition to those of the OS vendors. But Apple did not want to support deployment of third-party solutions on iPhones because of a number of factors, including privacy and operational concerns. Here is our understanding of Apple's concerns. From a privacy perspective, z-axis location determination is ultimately about determining user location, and a particular solution could involve extensive surveillance of end-user activity—such as a barometric pressure-based solution's requirement that the device frequently update baseline barometric pressure information for the user while outdoors. Or it could require frequent determination of when a user enters and exits a building. These activities may raise privacy issues. And from an operational perspective, Apple has suggested that the various functions required for a third-party implementation may require software changes at the level of the

operating system and the telephony applications (for appropriate integration with existing emergency services functions on the device) and have implications for a wide ranging number of device features including battery life.

Because iPhones make-up more than half of the consumer smartphones on Verizon's network, Apple's solution thus became a necessary component of the only approach that would have enabled Verizon to meet the compliance requirements. And to reduce the complexity of its approach to z-axis compliance on the various smartphone platforms, Verizon chose Google's ELS service as its primary solution for the Android platform. As explained below, there were significant reasons from a timing perspective to proceed with the OS vendors' solutions, and the OS vendors have a solid track record of support for and innovation in location-based services including for emergency services applications.

At the same time, Verizon cautioned the Commission throughout the underlying rulemaking that its dependence on the OS vendors and factors beyond its control put compliance with the rule deadlines at serious risk. But Verizon nonetheless supported the ± 3 meters/80 percent standard in the hope that the Commission's action would prod the broader wireless ecosystem toward that goal. And Verizon pressed forward with its efforts through an RFP, handset specifications, testing support, and parallel discussions with OS vendors.

Verizon's decision to focus efforts primarily² on the OS vendors' solutions was necessary for a number of reasons: the limited time until April 2021 required Verizon to start with relatively mature solutions that were more likely to achieve compliance on a timely basis;

² Verizon has been working on its own solution in parallel that, while in a nascent stage, could potentially be a candidate for deployment on the Android platform at some future point, as well as engaging in discussions with third-party providers, again, for potential use on the Android platform.

dependence on OS vendor support for a z-axis solution that the vendor would allow to work on its products; the OS vendors' improving performance prior to the COVID-19 pandemic; their prior record of improving location-based services; the efficiencies resulting from having OS-based solutions on both the iOS and Android platforms; and the intrinsic features of their solutions (e.g. scalability, backward compatibility and potential for eventual floor level accuracy and civic address information). No third-party solution would have enabled Verizon to fully meet the April 2021 milestone. Verizon is hopeful that the OS vendors may help it achieve *de facto* compliance through their solutions by April 3, but there is no factual basis to conclude that Verizon could have compelled the OS vendors to timely implement fully compliant solutions.

Given these facts, there is good cause to grant the Petition and allow more time to test and deploy compliant solutions. The Commission and the courts have consistently recognized that rule waivers are appropriate where a compliance deadline is infeasible due to factors outside the applicant's control. Here, the presumption that Verizon could compel key OS vendors to support third party solutions by April 2021—the Commission's primary basis for determining the deadline is feasible—was not accurate. Verizon tried diligently to do that but without success. And it has been working with the OS vendors to demonstrate *de facto* compliance with the required accuracy standard, but may not be able to do so by April 3. Strictly applying the rules would not serve the rule's underlying purpose of driving development and implementation of z-axis solutions. Instead it would leave Verizon without reasonable alternatives due to its the impact of COVID-19 on the development and testing of the OS vendors' chosen solutions and the separate validation testing necessary to certify compliance. Verizon thus requests an 18-month extension of, respectively, the April 3, 2021 and June 2, 2021 deadlines for achieving and certifying compliance with the z-axis rule.

III. BACKGROUND

Verizon “has been preparing for years” to enable it to select, test, and timely deploy dispatchable location and z-axis solutions that meet the Commission’s stringent requirements.³ The Commission has recognized throughout its rulemaking that service providers will require the support of other industry stakeholders, most notably OS vendors Google and Apple. Verizon diligently solicited and encouraged such support in the years prior to the upcoming April 2021 deadline. From the outset, however, Apple’s refusal to support third-party solutions because of privacy and operational concerns limited Verizon’s available options. Compliance with the rule is impossible without a solution for Apple devices, which represent over one half of the covered handsets on Verizon’s network. And the OS vendor-based solutions that Verizon decided to use as its primary compliance method are the ones Verizon reasonably determined would most likely enable it to ultimately fully comply with the rules.⁴

A. Indoor Location Accuracy Compliance Is Inextricably Linked to Availability of Capable and Test Bed-Validated Solutions and Devices.

Verizon must meet the following milestones for delivering 911 vertical location information on calls to PSAPs by deploying either dispatchable location or geodetic z-axis technology: by April 3, 2021 in each of the top 25 cellular market areas (CMAs); by April 3, 2023 in each of the top 50 CMAs; and by April 3, 2025 nationwide.⁵ Where compliance is

³ See *Wireless E911 Location Accuracy Requirements*, Order on Reconsideration, FCC 21-11, ¶¶ 26, 29 (2021) (“*Reconsideration Order*”).

⁴ For purposes of this Petition, the term “OS vendors” refers to Apple and Google, providers of the iOS and Android operating systems, respectively. The term “Original Equipment Manufacturer” or “OEM” refers to companies that manufacture handset devices for sale to consumers—and includes Apple (iPhone) and Google (Pixel), as well as companies like LG, Motorola, and Samsung.

⁵ 47 C.F.R. § 9.9(i)(2)(ii).

achieved through z-axis technology, the rule requires accuracy of ± 3 meters for 80 percent of wireless E911 calls. Unlike some other regulatory mandates, compliance is inextricably linked to a technology solution's demonstrated performance as "validated by an independently administered and transparent test bed process" for calls "made from [a] z-axis capable device" that "can measure and report vertical location without a hardware upgrade."⁶ Service providers meet this validation obligation through the CTIA-administered Test Bed (the "Test Bed").⁷

By June 2, 2021, Verizon must certify that it is "in compliance with the [vertical] location accuracy requirements applicable ... as of that date," including the April 2021 milestone.⁸ For purposes of certifying as to areas outside of the Test Bed cities, providers are "presumed to be in compliance by certifying that they have complied with the test bed and live call data provisions" of the rule, and must "certify that the indoor location technology (or technologies) used in their networks are deployed consistently with the manner in which they have been tested in the test bed."⁹ To ensure that a solution's Test Bed performance is genuinely representative of its accuracy across for all consumers across all geographic areas it must meet numerous Commission-mandated criteria. These criteria include testing in "dense urban, urban, suburban

⁶ *Id.*

⁷ See <http://www.911locationtestbed.org/>.

⁸ 47 C.F.R. § 9.9(i)(2)(iii).

⁹ *Id.*; see *Wireless E911 Location Accuracy Requirements*, Fourth Report and Order, 30 FCC Rcd 1259, ¶¶ 137-138 (2015) ("*Fourth Report and Order*") (stating "performance of positioning source methods ... will first be determined based on performance of the technology in the test bed" and "[t]he certification will establish a presumption that 911 location performance results derived from live call data from the six ATIS ESIF test cities are representative of the CMRS provider's E911 location performance throughout in areas outside the reporting areas." (emphasis supplied)).

and rural morphologies,” latency, location accuracy and reliability.¹⁰ As the “test bed must conform to [these] minimal requirements in order for test results derived from the test bed to be considered valid for compliance purposes,” a provider cannot certify compliance for use of a z-axis solution that has not been Test Bed-verified and that cannot otherwise be deployed throughout a provider’s network and devices.¹¹

Verizon continues to pursue both OS vendor-provided and third party z-axis solutions to meet the 3 meters/80 percent standard. But despite Verizon’s diligent efforts, the company will be unable to certify compliance through CTIA Test Bed-validated solutions because the Test Bed is currently shuttered due to the COVID-19 pandemic, and is not scheduled to resume operations until the second half of 2021. In addition, Verizon is concerned that test data generated by Verizon, Apple, and Google in their own respective testing environments may not be representative of performance in a CTIA Test Bed context, due to the impacts of the COVID-19 pandemic on all parties’ ability to test in broadly representative locations and at scale.

B. Verizon Diligently Pursued Dispatchable Location Through Deployment of the National Emergency Address Database.

From the outset, Verizon’s preferred indoor and vertical location solution for meeting the Commission’s indoor location accuracy rule was to provide dispatchable location through the planned National Emergency Address Database (NEAD). Beginning in 2015, Verizon and the other wireless providers diligently worked to develop and stand up the NEAD to support dispatchable location. The wireless industry spent tens of millions of dollars to create the NEAD. Verizon contributed information for millions of Wi-Fi access points to support the NEAD, and

¹⁰ 47 C.F.R. § 9.9(i)(3).

¹¹ See *Fourth Report and Order* ¶ 127.

incorporated the NEAD’s technical requirements in its network and in its handset specifications. Service providers performed tests confirming that, with OS vendor support and participation by other providers of Wi-Fi systems, it could deliver dispatchable location information to capable PSAPs.¹²

And independent of the NEAD, Verizon voluntarily worked with equipment manufacturers and solution vendors to develop and leverage the capabilities of “consumer home products” to deliver dispatchable location for customers when possible. Verizon has incorporated dispatchable location capability into its internal technology planning and product procurement practices to ensure that capability is considered early in the product development process. In fact, Verizon has begun delivering dispatchable location to PSAPs for 911 calls from certain devices when the information can be determined reliably. These include certain 911 calls using Voice over Wi-Fi and indoor Distributed Antenna System (DAS) configurations. And Verizon plans to incorporate dispatchable location capabilities into 5G home voice products.

Beginning in late 2018 and into mid-2019, however, OS vendors signaled to industry their concerns for the NEAD’s viability, and their eventual unwillingness to enable their products to support the NEAD.¹³ And securing data for sufficient numbers of Wi-Fi access points from

¹² Letter from Matthew Gerst, Vice Pres., Regulatory Affairs, CTIA to Marlene H. Dortch, Secretary, PS Docket No. 07-114, Att. B at 10, 15, 19 (filed Apr. 26, 2019); *see also* Qualcomm Comments at 5 (May 20, 2019) (“While the NEAD test report notes several key limitations that would need to be addressed prior to widescale deployment, including improved implementation via augmentation with additional database entries, the report establishes the validity of the NEAD concept”).

¹³ Apple eventually informed the Commission that it would support the NEAD if it met its own standards. Apple, Ex Parte Letter in PS Docket No. 07-114 at 2 (Oct. 29, 2019) (“[Apple] would be willing to support the NEAD approach upon credible demonstrations that doing so would provide improved location performance for Apple’s users and the public safety community.”).

third parties proved more challenging than anticipated. The NEAD, despite its promise, thus became untenable, due in large part to the lack of support from critical ecosystem players, including OS vendors and large operators of public Wi-Fi systems such as cable operators.¹⁴ Without this critical support from these other ecosystem participants for handset support and additional access point data, during 2019 Verizon and other wireless providers were forced to pivot to a z-axis based approach as the only other available method to comply.

C. Verizon Worked Diligently to Meet the April 2021 Z-Axis Location Accuracy Milestone.

Verizon’s efforts “to work with relevant stakeholders (vendors, handset manufacturers, public safety entities) to help meet the benchmark” reflect years of engagement with those parties over the course of the Commission’s multi-year rulemaking proceeding.¹⁵ Wireless providers’ dependence on OS vendors’ support for z-axis solutions, whether the OS vendor’s own solution or those of a third party, necessarily leaves providers with a limited scope of options. Apple’s refusal to support a third-party solution on iOS devices because of privacy and operational concerns, coupled with the large proportion of iPhones on Verizon’s network, meant that the only choice for a compliant solution was the Apple-supported HELO service. Verizon’s near-term z-axis technology choice was thus the best and necessary approach both from a compliance and consumer public safety policy perspective, and enables Verizon to continue to collaborate with OS vendors and other solution vendors to support supplemental z-axis and dispatchable location solutions.

¹⁴ See NCTA Reply Comments at 11-12 (June 18, 2019); NCTA Ex Parte Letter in PS Docket No. 07-114, at 1-2 (May 13, 2019).

¹⁵ *Reconsideration Order* ¶ 29. Despite the *Reconsideration Order*’s suggestion, this is not a situation in which challenges are “largely of [the provider’s] own making.” *Id.* ¶ 37.

1. *Verizon Cautioned that Factors Outside Its Control Could Jeopardize Compliance Despite its Diligent and Collaborative Efforts.*

Even though a z-axis approach was planned as a fallback for the NEAD rather than its primary compliance method, Verizon conducted planning and other efforts to test and ascertain the viability of z-axis solutions in parallel with the NEAD's development and implementation. The wireless industry established the Test Bed LLC in June 2015, assigned ATIS as the program manager in September 2015, and selected an administrator in March 2016. The first two stages of testing were completed by the end of 2016, and two additional stages completed by 1Q2018. During 2017, the industry also prepared for the critical "Stage Z" testing in establishing a three-city test bed (Chicago, Atlanta and San Francisco) covering dense urban, urban, suburban and rural morphologies and different climate ranges (a critical consideration for barometric pressure sensor-based solutions) and solicited vendor participants in September 2017.¹⁶

In August 2018, the Test Bed submitted a report to the Commission with test results for NextNav's and Polaris's barometric pressure sensor-based vertical location solutions—the result of months of testing, expenditures of considerable resources, and input from public safety. Based on these results of Test Bed activities at the time, CTIA recommended a ± 5 meters/80 percent standard as the Commission's initial accuracy metric. To address public safety's and the Commission's concerns for CTIA's recommended standard, and recognizing that solutions were likely to improve over time, in May 2019 Verizon supported adoption of the current ± 3 meters/80 percent standard. While solution vendors had not yet met that standard in the Test Bed and did not test using commercially available solutions, Verizon expected that formalizing that

¹⁶ See 911 Location Test Bed, LLC, *Report on Stage Z*, PS Docket No. 07-114 (filed Aug. 3, 2018).

standard could establish some regulatory certainty and help incentivize vendors and the broader wireless ecosystem to meet a concrete objective.¹⁷

Establishing a compliance standard was an important step because, in Verizon's experience, OS vendors and OEMs generally will not commit significant financial and engineering resources to meeting a wireless provider customer's regulatory obligation until the rule itself is finalized. Z-axis was no exception, and the Commission's adoption of the standard in November 2019 finally established a target that OS vendors would commit to try to meet.¹⁸

But in supporting this action, Verizon cautioned that:

Devices that support device-based hybrid solutions for horizontal location will not necessarily have all the capabilities needed to support the delivery and processing of vertical location information. For example, the barometric pressure sensor on most new smartphones is not enough to deliver and process such information. The device also must be able to, in sequence: receive assistance data from the Z-axis solution's or service provider's network; compensate for sensor bias and compute Z-axis location; and convey that data through support of the LPP/LPPE interface to the service provider. The feasibility and scalability of Metropolitan Beacon System (MBS) solutions are likewise dependent in part on chipset- and handset-level capabilities to enable the chipset to send the information through the modem layer. For our part, Verizon's device specifications already request the LPP/LPPE interface and NEAD support, *but virtually no handset manufacturers have implemented or activated these basic capabilities.*¹⁹

Despite these concerns, Verizon believed the April 2021 deadline might still be possible (though very aggressive) based on NextNav's and Polaris's Test Bed performance, Google's and Apple's own efforts in 2018 to begin development of their respective ELS- and HELO-based z-axis solutions, and on CTIA's planned Test Bed activities in 2019 and 2020.

¹⁷ Verizon Comments at 1-3 (May 20, 2019) (Verizon May 2019 Comments).

¹⁸ *Wireless E911 Location Accuracy Requirements*, Fifth Report and Order and Fifth Further Notice of Proposed Rulemaking, 34 FCC Rcd 11592 (2019) ("*Fifth Report and Order*"). That said, such commitments are at best informal. Neither Apple nor Google has been willing to enter into legally binding contractual commitments with Verizon to deliver these capabilities.

¹⁹ Verizon May 2019 Comments at 3-4 (emphasis supplied).

But achieving the milestones depended on OS vendors, OEMs, and solution vendors all working diligently and collaboratively with service providers.²⁰ And it depended on continued access to public buildings in multiple morphologies to assist in development and testing efforts, something that was effectively unavailable during the first three months of the pandemic, remains difficult to coordinate and obtain, and has contributed to the shuttering of the official Test Bed.

Verizon continued these collaborative efforts through and after the Commission's adoption of the ± 3 meters/80 percent standard in November 2019. Based on these efforts and on vendors' Test Bed performance during 2019, and on the importance of the Commission's public safety goals, Verizon opted to press forward toward compliance and, at the time, believed it was premature to formally challenge the Commission's November 2019 Order. Verizon again remained hopeful that further activities in late 2019 and through 2020 and further discussions and collaboration with handset vendors would yield demonstrable progress—if not achieving full compliance.²¹ Verizon hoped that these efforts would at least demonstrate a clear trend toward meeting the ± 3 meters/80 percent metric and minimizing the duration of any requested waiver relief.

In its comments on the accompanying *Notice*, however, Verizon again cautioned that this prediction was not without risks due to dependence on OS vendor and OEM support:

[T]he Commission should not limit its regulatory efforts to wireless service providers. Simply put, if consumers are to timely benefit from new device-based solutions, then devices will need to support either the equipment manufacturer's own compliant solution,

²⁰ See *id.* at 4 (“the Commission should continue to engage not just service providers and public safety stakeholders in this effort, but also... handset vendors”).

²¹ See CTIA, *CTIA's 9-1-1 Location Accuracy Technologies Test Bed Announces Additional Testing in 2020* (Jan. 24, 2020), <https://www.ctia.org/news/press-release-ctia-9-1-1-location-accuracy-technologies-test-bed-announces-additional-testing-in-2020>.

if available, or that of a third-party vendor. The Commission thus should consider applying its Title III and 911 rulemaking authority to other stakeholders as it has done, for example, with 911 call processing and VoIP services.²²

In the *Sixth Report and Order*, however, the Commission deferred consideration of this issue, finding it “outside the scope of the proceeding.”²³

2. *Verizon’s Selection of Z-Axis Technology Was Based on Realistic and Commercially Available Options.*

With the Commission’s proposal of the ± 3 meters/80 percent standard in early 2019, and as it became less and less likely by late 2018 and early 2019 that the NEAD would receive the necessary ecosystem support, Verizon redoubled its ongoing efforts to support handset-dependent solutions. Prior to the November 2019 *Fifth Report and Order*, Verizon was engaged in discussions with OS vendors and third-party vendors regarding their plans to enable service providers to meet the April 2021 deadline, whether through their own solutions, allowing third party solutions on their products, or a combination of both. In September 2019, Verizon stood up its own vertical location test bed with buildings in San Jose, California, Philadelphia, Pennsylvania and Atlanta, Georgia, and is in the process of expanding to some buildings in New York City, to support testing of different z-axis solutions in dense urban environments. To date, Verizon has supported four separate series of tests with vendors, and has planned more testing with OS vendors later this month.

²² Verizon Comments at 5 (Feb. 21, 2020) (citing 47 C.F.R. § 22.921, *Revision of the Commission’s Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Second Report and Order, 14 FCC Rcd 10954, ¶ 88 (1999), 47 U.S.C. §§ 615a-1(b)-(c), and 47 C.F.R. § 9.12(a)).

²³ *Wireless E911 Location Accuracy Requirements*, Sixth Report and Order and Order on Reconsideration, 35 FCC Rcd 7752, ¶ 13, n.33 (2020) (“*Sixth Report and Order*”).

Also in November 2019, Verizon issued a request for proposals (RFP) to OS vendors and other z-axis solution vendors formally soliciting proposed technical solutions to meet the ± 3 meters/80 percent standard. The RFP specified, among other things, full compliance with the accuracy, reliability and geographic scope requirements of the rule. The RFP also specified the need for z-axis client software to integrate into all Verizon devices, in particular Android and iOS, including requirements that: barometric pressure information on the device be calibrated and sent to Verizon's location server; the software support and be easily integrated into all devices equipped with barometric pressure sensors; the solution minimize battery drain and storage use; the solution meet defined latency and performance metrics; and the vendor detail any limitations or dependencies. And the RFP requested an implementation and delivery schedule.

Verizon continued to engage directly with OS vendors and solution vendors while the RFP was pending. In January 2020, shortly after the Commission finalized the ± 3 meters/80 percent standard in November 2019, Verizon created a draft product requirement for original equipment manufacturers that specified the need to meet the Commission's newly-adopted accuracy standard, including the need for Test Bed verification by September 2020. Verizon transmitted it to the OEMs during the first week of February 2020 with a request for feedback. Some OEMs sought to discuss the request with solution vendors, which Verizon supported. Parallel discussions were held with Google and Apple concerning z-axis support for Android- and iOS-based products, respectively.

By April 2020, OS vendor-based solutions began to emerge as the z-axis compliance option that Verizon felt would best enable compliance across the requisite number of handsets on Verizon's network with the time remaining until April 2021. Verizon reached this conclusion

based on OS vendors' and other vendors' responses to the RFP and accompanying discussions with vendors' technical teams, and based on Apple's concerns about customer privacy and the technical and operational impacts of third party vendors' solutions on its products. In June 2020, after careful consideration of the trade-offs and dependencies of different solutions, Verizon decided to focus its personnel and engineering resources on the OS vendors' planned z-axis solutions. Verizon thus followed up the RFP by providing formal z-axis specifications to OS vendors and OEMs that still left them free to either provide their own ± 3 meters/80 percent solution or ensure that a third-party solution (either Verizon's or a Verizon vendor's) is supported in their devices.

Verizon's decision to focus on the OS vendors' solutions was not made lightly and reflected extensive discussions with OS vendors and third party vendors. Indeed, through July 2020, Verizon continued to pursue the possibility that all OS vendors might allow use of a downloaded software application to support z-axis capability on their devices—in part in response to the Commission's July 2020 rule amendments intended to accommodate third party solutions. (Verizon continues to pursue this as a potential supplement to OS vendors' solutions.) And Verizon continues to collaborate with OS vendors by supporting performance testing in its own test bed areas, with appropriate COVID-19 safety precautions. But for the reasons explained in this Petition, it was clear in mid-2020 that the OS vendors' solutions were the only available alternative for purposes of attempting to meet the April 2021 milestone.

Timing. Even in the best of circumstances, testing and integrating solutions into Verizon's network and handset offerings typically requires 12-18 months. Because OS vendors' own device-based solutions springboard off of existing approaches for horizontal solutions (that already contain a placeholder for z-axis data), they presented opportunities to shorten that

timeframe. Verizon could not reasonably commit to a third party solution given the contingencies and obstacles to commercial implementation those vendors faced. Thus, it became necessary to make a business decision to commit technical, engineering and other resources to a technology approach that all of Verizon’s OS vendors were willing to support.

Handset Operating System Vendors’ Technology Decisions. Prior to the *Sixth Report and Order*, the rule required that service providers transmit z-axis location information for all 911 calls from “z-axis capable” handsets, defined broadly as handsets that “can measure and report vertical location without a hardware upgrade.”²⁴ Because not all of our OS vendors would support downloaded third party solutions to “measure and report vertical location” for z-axis capable handsets, such solutions were not a fully compliant option. The Commission subsequently expanded the definition of “z-axis capable” handsets to allow customers to consent or opt-in to a downloaded software application update.²⁵ In response to the Commission’s rule

²⁴ The *Fifth Report and Order* reasoned that “actions by carriers, device manufacturers, operating system providers, chipmakers, or z-axis vendors that would prohibit technically capable devices *from actually and effectively measuring and reporting z-axis information* put the public and emergency personnel at unacceptable risk.” *Fifth Report and Order* ¶ 25 (emphasis added). Handsets equipped with barometric pressure sensors but incapable of measuring and reporting z-axis information to PSAPs would not have met the Commission’s standard in effect then. That said, there is no guarantee that barometric pressure sensors will remain in consumer handsets going forward.

²⁵ See *Sixth Report and Order*, App. A (amending rule to allow service providers to meet the z-axis rule by “push[ing] the location technology to end users so that they receive a prompt or other notice ... even if the end user declines to use the technology or subsequently disables it.”). Acting Chairwoman Rosenworcel noted that the new approach “is fundamentally at odds with how 911 has previously been provisioned in this country.” *Id.*, Separate Statement of Commissioner Rosenworcel; see also 47 C.F.R. § 9.9(g)(1)(iv)-(v) (wireless provider must “[e]nsure that 100 percent of all new digital handsets activated are location-capable” and “achieve 95 percent penetration of location-capable handsets among its subscribers”); *IP-Enabled Services E911 Requirements for IP-Enabled Service Providers*, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 10245, ¶ 47 (2005) (rejecting policy of “allowing customers of interconnected VoIP providers to opt-in to or, for that matter, opt-out of E911 service”)) (“*VoIP 911 Order*”).

and policy change, Verizon inquired whether OS vendors might support the newly-permissible approach. But, as a practical matter, the time had already passed for Verizon to have moved forward with a different technology selection in order to meet the April 2021 milestone. And because not all of Verizon's OS vendors would agree to support third party solutions due to concerns about customer privacy and technical and operational impacts on their devices, the Commission's rule change did not improve the company's prospects for timely full compliance.

Manufacturer-Based Solutions Are Promising. By early 2020, just over one year in advance of the deadline, one of Verizon's OS vendors was making significant progress toward achieving ± 3 meters/80 percent for its products. In fact, this same vendor's performance level at the time was yet another basis for the Commission's determination in the *Sixth Report and Order* that the April 2021 milestone was still feasible.²⁶ Verizon agreed with the Commission that there was good reason to believe that, once a fully-functional OS vendor-based solution could be assessed through the Test Bed later that year, it would achieve compliance for a significant number of existing Verizon customers across its handset portfolio. Based on the results of promising testing recently undertaken in Verizon's own test bed, Verizon expects that prediction to stand.²⁷ Indeed, it remains possible that in the time remaining between the date of this Petition

²⁶ See *Sixth Report and Order* ¶ 19 (fact that one manufacturer's solution "achieved 3-meter accuracy for more than 50% of calls in the test" indicated "that those enhancements could be made available in advance of the April 2021 deadline" and another's planned testing in October 2020 suggested that "z-axis capability will be widely available to consumers."); cf. *Request of Progeny LMS, LLC for Waiver and Extension of Time*, Order, DA 20-755, ¶ 8 (WTB 2020) ("We find it relevant to our decision that Progeny was on track to meet the applicable construction deadline and that the pandemic caused disruption to delivery of the devices needed to initiate service to the fire departments").

²⁷ The Commission stated that service providers "may use different z-axis technologies in different areas." *Sixth Report and Order* ¶ 18 n.48. Verizon reasonably planned to rely on OS vendors' own solutions—for the same reason the Commission relied on them in affirming the

and the April 3 deadline, Verizon and its OS vendors will be able to generate test data from their own test beds sufficient to demonstrate substantial *de facto* compliance with the accuracy requirements. Verizon and its OS vendors are working hard towards that goal.

Service providers also must select solution vendors based in part on a vendor's longer-term viability and its past performance. Verizon's OS vendors have a track record of improving handset location accuracy via device-based hybrid solutions for horizontal location, as well as innovation in secure, reliable commercial location-based services.²⁸ There is still lingering uncertainty regarding the full geographic scope and availability of third party solutions. Finally, Verizon has also independently developed a solution using barometric pressure sensor data calibration. While this solution further validated the potential for handset-level solutions that employ a barometric pressure sensor-based approach, it is also dependent on other factors including OS vendor support, and therefore is not commercially viable at this time.

Future-Proofing and Backward Compatibility. Verizon expects that improvements in vertical location OS vendors' solutions would be more likely to quickly reflect improvements in their commercial location-based services. This expectation is based on Verizon's experience with its OS vendors and the nature of the software updates necessary to support z-axis for capable devices. And perhaps more significantly for compliance and public safety policy purposes, manufacturer-provided solutions would likely be compatible with more legacy handset models.

April 2021 milestone—but is hopeful for future prospects of third-party solutions like NextNav's for Verizon to use as a supplement to OS vendors' own solutions.

²⁸ Verizon's OS vendors and OEMs also enabled it to meet the Commission's challenging compliance deadlines for the availability of Wireless Emergency Alert geo-targeting in the second half of 2019.

Stepping Stone to Floor Level/Civic Address. Finally, the OS vendors’ solutions promise a path toward widespread availability of highly accurate z-axis location and, in some cases, delivery of an approximate civic address to PSAPs. During the rulemaking, Google noted that, prior to adoption of the z-axis metric, it was already working toward delivery of a civic address and floor level similar to a dispatchable location.²⁹ Apple has similarly recognized the importance of delivering accurate vertical information estimates and in October 2019 “commit[ted] to improving the overall X/Y and Z performance of its devices with each iteration of hardware and software, and to participating in a CTIA z-axis test campaign by the end of 2020.”³⁰ Verizon believes that its focus on OS vendor-based solutions will better serve its longer-term objectives of providing floor level or civic address information akin to dispatchable location, for all its customers.

For these reasons, Verizon reasonably determined to rely on the z-axis solutions under development by its OS vendors. But it appears likely at this point that these z-axis alternatives will not demonstrate *de facto* compliance with the accuracy requirements by the April 2021 milestone, and it is certain that they will not be able to be validated in the Test Bed until likely early in 2022. OS vendors’ solutions continue to face interim performance challenges of their own due to the substantial drop in Wi-Fi access point availability in multi-story commercial

²⁹ See Google Comments at 4 (Feb. 21, 2020) (it “has significantly shifted resources away from work on floor labels in the wake of the 2019 Order/FNPRM, likely lengthening our time horizon for introducing new floor label technologies”).

³⁰ See Apple Ex Parte Letter at 4 (Oct. 29, 2019).

office buildings (and which also cannot be validated in the CTIA Test Bed).³¹ And z-axis solutions of third party vendors are not a reasonably available option because of Apple’s privacy and operational concerns with using them. Verizon would thus require waiver relief regardless of the solution it selected and regardless of whether that solution could meet the accuracy requirement in unofficial test bed environments. Good cause thus exists to waive the rules as requested in this Petition.

IV. VERIZON MEETS THE COMMISSION’S STANDARD FOR GRANT OF TEMPORARY WAIVER RELIEF.

Verizon’s diligent efforts to achieve compliance, in the context of service providers’ dependence on unaffiliated third party OS vendors and the COVID-19 pandemic, constitute good cause and unique circumstances such that application of the rule would be inequitable, unduly burdensome and otherwise leave Verizon with no reasonable alternative for compliance.

A. The Z-Axis Milestones Are Premised on the Service Providers’ Ability to Compel the Availability of Compliant Vertical Location Solutions.

The Commission applies its traditional legal standard to requests for waiver of its E911 requirements—i.e., that the rules may be waived for good cause shown, and that waiver is only appropriate if special circumstances warrant a deviation from the general rule, and such deviation serves the public interest.³² The Commission’s “discretion to proceed in difficult areas through

³¹ See Google Ex Parte Letter at 1-2 (Nov. 4, 2020). Based on more recent developments there may be new opportunities to support third party solutions, though they would not be commercially available until sometime well after the April 3, 2021 milestone.

³² 47 C.F.R. § 1.3; *Northeast Cellular Telephone Co. v. FCC*, 891 F.2d 1164, 1166 (D.C. Cir. 1990) *citing* *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969). Section 1.925(b)(3) provides further that waiver may be warranted if “(i) [t]he underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and that a grant of the requested waiver would be in the public interest; or (ii) [i]n view of unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly

general rules is intimately linked to the existence of a safety valve procedure for consideration of an application for exemption based on special circumstances.”³³ Moreover, where, as here, the Commission “pursue[s] plans and policies bottomed on informed prediction,” the availability of meaningful waiver relief is critical to the validity of its overall regulatory scheme. The Commission must take a “hard look” at a petition, and denial of a waiver may not be “so insubstantial as to render that denial an abuse of discretion.”³⁴ As the D.C. Circuit has confirmed in the E911 context, inquiries of “technical and economic feasibility [are] necessary by the bar against arbitrary and capricious decision-making.”³⁵ And the case for waiver relief is particularly

burdensome or contrary to the public interest, or the applicant has no reasonable alternative.” 47 C.F.R. § 1.925(b)(3).

³³ See *WAIT Radio* at 1158 (“provision for waiver may have a pivotal importance in sustaining the system of administration by general rule”); *Telocator Network of America v. FCC*, 692 F.2d 525, 550 n.191 (D.C. Cir. 1982) (“Commission has an ongoing obligation to monitor its regulatory programs and make adjustments in light of actual experience” and “a duty to finetune its regulatory approach as more information becomes available ...”); *P&R Temmer v. FCC*, 743 F.2d 918, 929 (D.C. Cir. 1984) (“Where any administrative rule, although considered generally to be in the public interest, is not in the public interest as applied to particular facts, an agency should waive application of the rule”).

³⁴ *WAIT Radio* at 1159; *KCST-TV v. FCC*, 699 F.2d 1185, 1195 (D.C. Cir. 1983) (“in considering the waiver application, the Commission acted arbitrarily in not giving [applicant’s] data a ‘hard look’”); see also *Florida Municipal Power Agency v. FERC*, 411 F.3d 287, 292 (2005) (agency “fail[ed] to give ‘meaningful consideration’ to the application for waivers” as it “declined to address [appellant’s] request for an impossibility exception.”); *Gas Transmission Northwest Corp. v. FERC*, 363 F.3d 500, 503 (D.C. Cir. 2004) (agency “cannot rest its refusal of [the] waiver request simply on the underlying justification for its general [rule].”); *Gulf Power Co. v. FERC*, 983 F.2d 1095, 1101 (D.C. Cir. 1993) (reversing denial of waiver relief as the “sanction ... is clearly disproportionate to the error committed ... failed to balance the equitable considerations the agency itself agrees are relevant ... [and] failed to examine possible alternative sanctions that would have produced a result more proportional to [the] violation”).

³⁵ *Nuvio v. FCC*, 473 F.3d 302, 303 (D.C. Cir. 2006); cf. *USTelecom v. FBI*, 276 F.3d 620 (D.C. Cir. 2002) (“unrebutted evidence in the record” including information from equipment manufacturers “suggests that it would be impossible for carriers to install additional capacity in such a short time period”); *Alliance for Cannabis Therapeutics v. DEA*, 930 F.2d 936, 940 (D.C. Cir. 1991) (“impossible requirements imposed by an agency are perforce unreasonable.”).

compelling when compliance depends on factors outside the control of a service provider and the Commission’s authority.³⁶

Service providers’ ability to meet the vertical location milestones depended on various factors. But none was more critical to the Commission’s feasibility determination than its assessment of OS vendors’ ability to support service providers, either through their own or third party solutions. From the beginning of this rulemaking, the Commission “believe[d] that [the] 3-meter metric will encourage CMRS providers to work with NextNav, Polaris, and emerging location and device vendors to achieve more precise vertical location accuracy solution” and “support the development of scalable vertical location solutions that can be deployed in time to meet the carriers’ 2021 and 2023 deadlines.”³⁷ In later adopting the rule, the Commission acknowledged that solutions “will depend to some extent on third parties to support proper installation and calibration of barometric sensors in user devices, and that solutions will only work if the systems are compatible and information is correctly relayed between providers, the handset and operating system providers, and the PSAPs,” as well as the risk that “actions by carriers, device manufacturers, operating system providers, chipmakers, or z-axis vendors that

³⁶ See, e.g., *Procedures for the Post-Incentive Auction Broadcast Transition*, Public Notice, DA 17-106, ¶ 25 (MB 2017) (strong case for waiver of station construction deadline if “due to extraordinary technical or legal issues beyond the station's control, it is impossible to construct the [required] facility ...”); *Consolidated Request of the WCS Coalition for Limited Waiver of Construction Deadlines for 132 WCS Licenses*, Order, 21 FCC Rcd 14134 (2006) (granting extension of construction period to all 2.3 GHz licensees based in part on technical problems and economic infeasibility of use of proprietary equipment); see also *Blanca Tel. Co. v. FCC*, 743 F.3d 860, 862-63 (D.C. Cir. 2014) (affirming waiver approach where manufacturers “were slow in developing compliant models and ... compliant handsets did not trickle down to supplier inventory in time for many service providers to meet the deadline”).

³⁷ *Wireless E911 Location Accuracy Requirements*, Third Further Notice of Proposed Rulemaking, 29 FCC Rcd 2374 ¶¶ 19, 26 (2014) (“*NPRM*”).

[c]ould prohibit technically capable devices from actually and effectively measuring and reporting z-axis information”³⁸

Despite providers’ “concerns about their ability to compel handset manufacturers and operating system providers to cooperate,” the Commission reasoned that they “are capable of negotiating requirements with such third parties and establishing contractual timelines that will enable timely deployment of z-axis solutions in time to meet the deadlines in the rules.”³⁹ In subsequently rejecting “regulatory action directed at device manufacturers to require their cooperation with wireless providers to meet the z-axis deadlines,” the Commission “continue[d] to believe that the flexibility, technology neutrality, and privacy protections afforded by our rules will enable CMRS providers to negotiate requirements with such third parties and establish contractual timelines that will enable timely deployment of z-axis solutions.”⁴⁰ While the Commission further “expect[ed] device manufacturers and others to cooperate and work in good faith with CMRS providers to expedite these efforts as needed to meet the upcoming deadlines,”⁴¹ it has been difficult to coordinate all of the necessary testing and development activities of these industry players during the COVID-19 pandemic.⁴²

³⁸ *Fifth Report and Order* ¶¶ 20, 25. The Commission even committed to “take all appropriate action *against any company* that obstructs the effective deployment of such technologies in a timely manner.” *Id.* ¶ 25.

³⁹ *Id.* ¶ 30.

⁴⁰ *Sixth Report and Order* ¶ 43.

⁴¹ *Id.*

⁴² The Commission has recognized that service providers’ limited impact on the handset market can warrant relief for service providers. *See Section 68.4(a) of the Commission’s Rules Governing Hearing Aid-Compatible Telephones et al.*, Memorandum Opinion and Order, 20 FCC Rcd 15147, ¶ 8 (2005) (T-Mobile waiver request “evinces the company’s meaningful efforts to address the obstacles that are largely out of its control”).

The Commission also predicted that “that the solutions offered by Polaris and NextNav *could be made widely available* to consumers,” observing that “Polaris contends that its software *can be widely* deployed as part of an OS upgrade or a carrier upgrade, and NextNav states that software updates for its solution *can be uploaded* to most z-axis capable handsets that were previously purchased.”⁴³ The Commission affirmed these findings on reconsideration, relying on NextNav and Polaris “assert[ions] ... that their solutions *will be available* for deployment by the initial deadline in April 2021” and finding information in the record concerning wireless providers’ implementation efforts inadequate to warrant a modification of the milestones.⁴⁴

The Commission thus presumed that wireless providers can ensure OS vendors would meet the required compliance dates under any and all circumstances, whether through the OS vendors’ solutions or those of third party vendors, and used that presumption as the linchpin to find that its z-axis milestones were feasible. But that presumption may prove to be incorrect if, despite Verizon’s best efforts in this regard, *de facto* compliance with the required accuracy is not demonstrated by the April 2021 milestone. And with respect to the Commission’s finding of compliant third-party solutions, the presumption that service providers could dictate implementation of third-party solutions has proven to be incorrect. While the purely *technical and operational* issues around third-party solutions might be able to be resolved by those stakeholders to support third party solutions if they were able to be persuaded of the efficacy of that activity, concerns over privacy and whether the effort to implement third-party solutions provides any material benefit over the OS vendors’ own solutions, appear to present a real and

⁴³ *Sixth Report and Order* ¶¶ 19, 41 (emphasis supplied).

⁴⁴ *Reconsideration Order* ¶ 37 (emphasis supplied) (finding “no specific evidence of CMRS providers’ efforts to collaborate with these third parties or any third-party refusal of such efforts.”).

effective barrier as OS vendors must ultimately agree to support those solutions on their products.⁴⁵ Although Verizon has worked in good faith with the OS vendors throughout this process and maintains strong working relationships with them in a range of areas, the very real possibility that wireless providers do not exercise this level of influence in today’s marketplace was not “carefully considered” in the rulemaking.⁴⁶

Interconnected VoIP providers faced a similar situation in 2005 when they were dependent on interconnection support from wireline 911 providers to deliver 911 calls and ANI/ALI to PSAPs to comply with the Commission’s rules. The Commission found there (and the D.C. Circuit in *Nuvio* agreed) that, while not obligated to do so, “the record contained evidence that major ILECs *were cooperating with nomadic [VoIP providers] and ‘increasingly offering E911 solutions that allow VoIP providers to interconnect directly to the Wireline E911 network through tariff, contract, or a combination thereof’*”—indeed, that these things “had already happened.”⁴⁷ Here, in contrast, the Commission found that service providers only

⁴⁵ In its *Reconsideration Order* the Commission observed that “any dispatchable location solution which is merely technically *possible* but also cost prohibitive is not feasible.” That same rationale applies with respect to z-axis. *Reconsideration Order* ¶ 48; *cf. Bunker Hill Co. v. EPA*, 572 F.2d 1286, 1301 (9th Cir. 1977) (“record must establish that the required technology is feasible, not merely possibly feasible”); *Duquesne Light Co. v. EPA*, 522 F.2d 1186, 1196 (D.C. Cir. 1975) (decision “without investigating and resolving the serious economic [feasibility] questions” in the record was arbitrary and capricious).

⁴⁶ See *P&R Temmer*, 743 F.2d at 930 (citing *Industrial Bdcasting Co. v. FCC*, 437 F.2d 680, 683 (D.C. Cir. 1970)). In response to Verizon requesting “regulatory action directed at device manufacturers to require their cooperation with wireless providers”, the Commission summarily dismissed the request and restated its November 2019 prediction that stakeholder collaboration would suffice. *Sixth Report and Order* ¶ 13 n.33 and ¶ 43. The Commission again dismissed those concerns in the *Reconsideration Order*, agreeing with unsupported assertions in the record, including the counterintuitive argument that it should “refus[e] to reward OS providers for obstructing public safety by declining to consider any extension of the” milestones. See *Reconsideration Order* ¶ 37 nn.110 and 114.

⁴⁷ *VoIP 911 Order* ¶ 39, *aff’d Nuvio v. FCC*, 473 F.3d 302, 309 (D.C. Cir. 2006); *Nuvio Corp. v. FCC*, No. 05-1248, Transcript of Proceedings, at 19 (D.C. Cir. Sept. 12, 2006)

“could” or “can” comply as a technical matter, not that they were *already* complying—as was the case with VoIP providers. The Commission’s brief to the *Nuvio* court presciently found that while “record evidence there justified the Commission’s predictive judgment . . . [t]o the extent that petitioners have genuine problems with a particular ILEC or are unable to obtain p-ANI in a particular region where they provide service, such fact-specific issues are most properly raised in a complaint or waiver petition.”⁴⁸

To deny Verizon’s request for waiver relief, the Commission would need to conclude that under its existing regulatory construct and the dynamics of today’s wireless marketplace, Verizon somehow could have compelled OS vendors to enable Verizon to meet the April 2021 milestone, either through the OS vendors’ own solutions or by enabling the use of third party solutions. There is simply no factual or other reasonable basis for that conclusion.

B. Compliance with the April 3, 2021 Milestone Is Not Feasible Despite Verizon’s Cooperative and Collaborative Efforts with Other Stakeholders.

Verizon has met the Commission’s expectations of service providers to negotiate and collaborate with other stakeholders to meet the April 2021 milestone. Verizon’s and other service

(statements of James M. Carr, counsel for respondents) (emphasis added); *see also Garrett v. FCC*, 513 F.2d 1056, 1057-59 (D.C. Cir. 1975) (remanding denial of broadcast license applicant’s waiver request made necessary by demonstrated technical and engineering challenges); *Facilitating the Deployment of Text-to-911 and Other Next Generation 911 Applications; Framework for Next Generation 911 Deployment*, 29 FCC Rcd 9846, ¶ 38 (2014) (technical feasibility determination based on “existing text-to-911 deployments”); *Revision of the Commission’s Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems Request for Waiver by Verizon Wireless*, Order, 16 FCC Rcd 18364, ¶ 23 (2001) (granting waiver seeking “a timeline consistent with” network vendors “and on the availability of compliant handsets.”).

⁴⁸ Federal Communications Commission, Brief for Respondents, *Nuvio v. FCC*, No. 05-1248, at 29 (D.C. Cir. Feb. 22, 2006) (*citing* 47 U.S.C. § 208, 47 C.F.R. § 1.3, emphasis supplied). Complaint remedies under Section 208 of the Act are unavailable against OS vendors and OEMs.

providers' efforts, with the NEAD initially and with vertical solutions afterward, have helped to further the development and progress of vertical location solutions generally. There is no factual basis to conclude that Verizon "ignore[d] the significant role that CMRS providers themselves play in implementing solutions," "failed to take any role in pursuit of a collaborative solution" with OS vendors, OEMs and solutions providers, or "placed [its] bets on either the emergence of an OS-based solution" or rule changes.⁴⁹ Indeed, the record above shows just the opposite, that Verizon has diligently "work[ed] with relevant stakeholders (vendors, handset manufacturers, public safety entities) to help meet the benchmark,"⁵⁰ and that Verizon has met the Commission's standards for grant of waiver relief.

1. *Strict Application of the Rule Would Not Serve its Underlying Purpose of Driving Development and Implementation of Z-Axis Solutions.*

First, "the underlying purpose of the rule(s) would not be served" by strictly applying the rule here. Strict application of the April 2021 deadline for meeting the ± 3 meters/80 percent rule would not expedite OS vendors' support for, or the availability of, z-axis solutions for the benefit of consumers and PSAPs. Nor would strict enforcement against Verizon compel its OS vendors to change their business decisions or enable Verizon to take a different course of action that could expedite its compliance with the rule. Nor could it compel re-opening of the Test Bed, which has been closed until later this year due to public health concerns from the COVID-19 pandemic. As shown above, Verizon has undertaken all the actions the Commission expected of service providers to attempt to meet the April 2021 milestone.

⁴⁹ *Reconsideration Order* ¶¶ 36-37.

⁵⁰ *Id.* ¶ 32.

And grant of the requested waiver would be in the public interest. Verizon seeks only an extension of the initial milestone, not permanent relief. Grant of the waiver would provide regulatory certainty for Verizon and other industry stakeholders and facilitate deployment of a solution nationwide. It would not penalize the parties for actions taken by the Test Bed to shutter operations to protect public health. And the continued use and deployment of OS vendors' solutions could offer a technology stepping stone to the Commission's and public safety's longer-term objectives of civic address or floor-level accuracy.⁵¹

2. *Strict Application of the Rule Would Be Inequitable and Leave Verizon Without Reasonable Alternatives.*

The “unique or unusual factual circumstances of the instant case” also support a temporary waiver of the rule. Verizon’s experience reflects a unique combination of factors. Verizon’s diligent efforts to achieve compliance have far exceeded what has been necessary to secure OS vendor support for other regulatory compliance obligations in the past, including E911 horizontal location capabilities, hearing aid compatibility, and Wireless Emergency Alerts. Verizon’s dependence on OS vendor support for *all* available solutions, together with the absence of any commensurate regulatory duties for OS vendors, presented another substantial technical and transactional obstacle to meeting the milestone. And the technical complexities of developing and implementing a compliant z-axis solution in the first instance, standing alone, would have made compliance with the April 2021 milestone extremely difficult. Generating a

⁵¹ See *Fourth Report and Order* ¶ 46 (“the feasibility of dispatchable location is linked to the proliferation of indoor, infrastructure-based technologies, including small cell technology, distributed antenna systems (DAS), Wi-Fi access points, beacons, commercial location-based services (cLBS), institutional and enterprise location systems, and smart building technology.”); see also *id.* ¶ 62 (“[g]iven the commercial benefits of deploying the technologies that would support improved indoor location accuracy, we anticipate that commercial location systems will continue to proliferate, providing additional resources that could be leveraged for E911 use”).

reliable z-axis is objectively far more challenging than using more established GPS technologies to obtain horizontal location, which only became widely available for consumers several years after those rules were adopted in 1996.⁵² Each vertical location solution involves technical and public safety policy tradeoffs that preclude Verizon from using any of them to achieve full compliance. Together, these present a unique and unusual combination of factors that make strict application of the rule inequitable.

Moreover, no reasonable alternative to noncompliance exists. OS vendor-based solutions, while more scalable and backward-compatible, are improving but have not yet shown they can fully meet the Commission's location accuracy standards and cannot be fully vetted in the Test Bed for that purpose during the COVID-19 pandemic—as the rule expressly requires.⁵³ And despite the promise of third party solutions, on which the Commission has relied as its primary basis for the April 2021 milestone, they face challenges that preclude their use as an option for compliance with the April 3 deadline.⁵⁴ In light of these challenges, application of the rule would

⁵² After various fits and starts with solution vendors, some service providers and OEMs were eventually able to leverage GPS capabilities in handsets, though only in a few device models by the end of 2001 and not uniformly in use by consumers until late 2005 – five and nine years after the rules were first adopted, respectively. Verizon has met all horizontal location deployment benchmarks since.

⁵³ Should testing activities with OS vendors in Verizon's internal test bed during the pendency of the Petition reveal an improved trajectory for meeting the ± 3 meters/80 percent standard, we will revisit the need for the full 18-month extension requested in the Petition.

⁵⁴ While the Commission has asserted that NextNav's and Polaris's solutions *could* enable compliance, *see supra* Section IV.A, they did not demonstrate full compliance in the Test Bed—so service providers using those solutions would still need to obtain a rule waiver in order to certify compliance with the April 2021 deadline—nor did the Commission directly address the practical challenges to gaining consensus for the implementation of third-party solutions on smartphones. And given that not all OS vendors will support third party solutions in the first instance—as is technically required for them to function—the Commission's assertion is moot.

be inequitable and unduly burdensome, and leave Verizon with no reasonable alternative for compliance.

V. REQUEST FOR RELIEF

Verizon seeks temporary relief from the following subparagraphs of the Commission's indoor location accuracy rule as follows:

April 3, 2021 Milestone. Verizon requests an 18-month extension of the April 3, 2021 milestone, through October 3, 2022, for implementing the ± 3 meters/80 percent z-axis location accuracy standard in the top 25 CMAs.

June 1, 2021 Certification. Verizon also requests an 18-month extension of the accompanying June 1, 2021 deadline through December 1, 2022, to certify that Verizon has met the criteria for the ± 3 meters/80 percent milestone.

VI. CONCLUSION.

For the foregoing reasons, grant of this petition meets the Commission's high standards for waiver and is consistent with the public interest.

Respectfully submitted,

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