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Public Advocates Office
California Public Utilities Commission

Opening Testimony of Alejandra Martinez on Impacts to Broadband Service Quality

Verizon Proposed Acquisition of Frontier, 2024

Application (A.) 24-10-006

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MEMORANDUM

This report is prepared by Alejandra Martinez of the Public Advocates Office (Cal Advocates) at the California Public Utilities Commission under the general supervision of Program Manager, Ernesto Falcon. Attachment A to this testimony presents a statement of qualifications from Alejandra Martinez. Cal Advocates is represented by attorney Scott Merrill in this proceeding. This testimony presents Cal Advocates' analysis of the Joint Application 24-10-006 of Verizon and Frontier (Application or A.24-10-006) and recommendations regarding broadband service quality.

EXECUTIVE SUMMARY

On October 18, 2024, Verizon and Frontier (Joint Applicants) filed Application (A.) 24-10-006 (Application) with the California Public Utilities Commission (Commission) seeking approval for Verizon to acquire Frontier's California subsidiaries (Proposed Transaction).[1] Given Verizon's prior ownership of this service territory, the Proposed Transaction would represent a reestablishment of Verizon's control over these entities, resulting in Frontier's California customer base becoming direct customers of Verizon once again.

Historically, under both Verizon and Frontier ownership, the affected service territory has received substandard service quality. A Commission Staff Report found that between 2010 and 2013, Verizon's service quality was below Commission standards, particularly in extent and length of voice service outages.[2] These findings supported the need for the Network Exam Phase I, a network infrastructure study of Verizon, which found that from 2010 until the transfer of assets to Frontier in 2016, Verizon failed to restore voice outages within 24 hours in virtually every reporting month.[3] These deficiencies continued under Frontier's ownership, which oversaw significant and persistent issues in outage restoration, installation intervals, and other metrics for both voice and broadband as documented in the Network Exam Phase II,[4] Frontier's Acquisition of Verizon proceeding in 2015,[5] and Frontier's Restructuring proceeding in

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[1] Application (A.) 24-10-006, Joint Application for Approval of the Transfer of Control of Frontier California Inc. (U 1002 C), Citizens Telecommunications Company of California (U 1024 C), Frontier Communications of the Southwest Inc. (U 1026 C), Frontier Communications Online and Long-Distance Inc. (U 7167 C), and Frontier Communications of America, Inc. (U 5429 C), to Verizon Communications Inc. Pursuant to California Public Utilities Code Section 854, filed October 18, 2024 (Application).

[2] See Cal Adv-07 Exhibit C-1 (Exhibit) "CPUC Staff Report," California Wireline Telephone Service Quality Pursuant to General Order 133-C, Calendar Years 2010 through 2013 at 26.

[3] See Exhibit C-2 "Network Exam Phase I Report" at 257.

[4] See Exhibit C-3 "Network Exam Phase II Report" at 214.

[5] See Exhibit C-4 "A.15-03-005 Adam Clark Testimony" at 2.

2020.[6] Improvements in service quality under both ownerships only materialized under strict Commission conditions for approval.[7]

The Joint Applicant's history of poor service quality highlights the importance of evaluating the Proposed Transaction against the public interest requirements of Public Utilities Code Section 854(c). As identified in the Assigned Commissioner's Scoping Memo and Ruling, this testimony answers the question of whether the transaction will "maintain or improve the quality of service to public utility ratepayers in the state," specifically focusing on broadband service quality with an emphasis on the importance of fiber deployment.[8]

The Joint Applicants assert that the Proposed Transaction will improve broadband service quality.[9] However, they fail to support this claim, particularly as they make no firm commitments to future fiber deployment— an essential element to improved service quality, as this testimony will demonstrate. Indeed, absent specific and enforceable commitments to expand fiber deployment, the Proposed Transaction will negatively impact broadband quality, reliability, and availability in California.

Therefore, based on the evidence presented herein, including the Joint Application, testimonies, and other relevant information, the Commission should impose the following measures as conditions of approval. These measures are necessary to ensure the Proposed Transaction does not adversely affect service quality and specifically addresses the need for increased access to fiber-to-the-premises (FTTP) in the affected

[6] See Exhibit C-5 "A. 20-05-010 Cameron Reed Testimony" at 11.

[7] See Exhibit C-3 "Network Exam Phase II Report" at 217 and D.15-12-005, *Decision Granting Application Subject to Conditions and Approving Related Settlements*, December 9, 2015 at 67.

[8] Assigned Commissioner's Scoping Memo and Ruling, A. 24-10-006, January 13, 2025 at 6.

[9] Application at 17.

service area, guaranteeing high-quality, reliable, and future proof broadband service for ratepayers.[10]

SUMMARY OF RECOMMENDATIONS

To ensure the continued provision of reliable and high-quality broadband services following the proposed transaction, the Commission should:

- Require Verizon to make specific commitments to deploy FTTP broadband as recommended by Cal Advocates witness Lucas Duffy.[11]
- Require Verizon to develop and present a comprehensive plan that ensures a smooth transition and minimizes service disruptions. This plan should include penalties for disruptions arising from the transition, as described by Cal Advocates witness Lucas Duffy.

I. INTRODUCTION

The Proposed Transaction has substantial implications for broadband deployment and accessibility in California. This testimony examines the potential impact of this transaction on broadband service quality, reliability, and availability, emphasizing the crucial role that FTTP plays in ensuring equitable access to high-quality broadband.

The Application distinctly lacks firm commitments to deploy fiber in California. This is problematic given the poor service quality observed in areas lacking FTTP, such as those still reliant on Frontier's outdated Digital Subscriber Line (DSL) technology. Furthermore, Verizon's focus on investing in and promoting its 5G fixed wireless access (FWA) technology raises additional concerns.[12] While FWA may offer some improvement over Frontier's copper DSL network, it is not a viable long-term substitute

[10] "Future-proof" refers to fibers ability to accommodate increasing bandwidth demands and technological advancements without costly infrastructure upgrades. Fiber has unlimited bandwidth capacity, and upgrades primarily involve changing the terminal equipment, rather than replacing the entire network, making it a more sustainable and cost-effective long-term investment compared to other technologies; See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates Data Request 02," Question 6 at 13.

[11] See Cal Adv.-02: Testimony of Lucas Duffy: Executive Summary of Cal Advocates Testimony & Proposed Transaction Conditions.

[12] See Exhibit C-7 "Verizon Press Release Oct 2024"; Opening Testimony for Verizon (Tom Nugent) at 13.

due to inherent limitations in capacity and reliability.[13] As it stands, the transaction risks worsening disparities, leaving consumers without access to FTTP at a disadvantage and limiting opportunities for economic and social advancement in underserved communities.[14]

While the Joint Applicants claim that the transaction will lead to improved service quality,[15] quantitative evidence suggests that true improvements are inextricably linked to the deployment of FTTP. Fiber broadband is rapidly becoming essential for meeting the increasing demand for bandwidth-intensive applications, supporting economic growth, and bridging the digital divide. The Commission's own Broadband Equity, Access, and Deployment (BEAD) under the guidance of the National Telecommunications and Information Administration's (NTIA) Notice of Funding Opportunity (NOFO), recognize the critical role of fiber in achieving universal broadband access.[16] The NOFO explicitly prioritizes fiber-based projects, recognizing their superior speed, reliability, and scalability compared to other technologies.[17] The Joint Applicants have also extensively acknowledged the advantages of fiber, stating that "fiber is a proven technology that has been embraced around the world" due to its immunity to environmental factors, ability to support high bandwidths, and energy efficiency.[18] They also highlight the advantages of fiber in supporting advanced broadband services and its "future proof" nature, allowing for easy updates without expensive network upgrades.[19]

To inform this analysis, Cal Advocates conducted a comprehensive review of the Joint Applicants' broadband service quality data and performance, including their

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[13] Opening Testimony for Verizon (Tom Nugent) at 6.

[14] Divestment in infrastructure is "most pronounced in the more rural and low-income service areas." See Exhibit C-2 "Network Exam Report Phase 1" at 2.

[15] See Application at 17.

[16] BEAD Program Initial Proposal Volume II at 18.

[17] BEAD NOFO, Section IV.B.7.b.2.i, at 42.

[18] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02", Question 6 at 13.

[19] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02", Question 6 at 13.

responses to data requests and independent research using key broadband service quality metrics. Their performance was assessed against established standards, including those set by the Commission's General Order 133-D (GO 133-D) and the Federal Communications Commission (FCC).

This testimony is structured to provide the Commission with: (1) an overview of Frontier and Verizon's broadband networks and service offerings in California; (2) a comprehensive analysis of service quality using various metrics; (3) an evaluation of potential immediate transaction impacts, referencing the 2016 merger; and (4) recommendations for the Commission's consideration.

II. BROADBAND SERVICE QUALITY PERFORMANCE

A. Network and Service Offerings

This section outlines the broadband network infrastructure and service offerings of Frontier and Verizon in California. While Frontier offers FTTP broadband to most customers, a significant portion of their service area still relies on DSL technology. In contrast, Verizon focuses exclusively on FWA via its 5G and 4G LTE networks.

1. Frontier Broadband Network Overview

Frontier has broadband services deployed to 1,805,528 locations across Southern California, primarily serving Los Angeles, Riverside, and San Bernardino Counties, with a smaller customer base in rural areas.[20] Frontier serves 93% of these locations with FTTP and 7% with DSL.[21] Frontier's broadband locations equate to about **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** FTTP home passings, and **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** copper DSL

[20] A. 24-10-006 Aron Opening Testimony at 30; A "location" is a habitable business or residence where fixed broadband service is, or can be, installed. A single structure with multiple addresses counts as one location. Providers must have built infrastructure and either have a customer or be able to perform a standard installation (within 10 days) to report serving a location.

[21] Unlicensed Fixed Wireless make up less than 1% of Frontier's broadband offerings.

home passings.[22] In total, for all voice and broadband services, Frontier passes over **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** homes. Notably, Frontier does not have FTTP deployed to a substantial number, **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>**, of homes within its territory.[23] And in areas where only DSL is available, not a single connection meets the FCC's definition of broadband.[24]

The dominance of fiber within Frontier's broadband offerings is reflected in their customer base: the majority,**<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>**, of active subscribers are connected to FTTP, while a fraction, **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>**, remain on DSL.[25] Frontier's focus on FTTP has positioned it as the largest pure-play fiber provider in California, driven by strategic shifts, state incentives like the California Advanced Services Fund (CASF), and Commission obligations related to the bankruptcy proceeding. Specifically, during its Chapter 11 Restructuring, Frontier agreed to deploy FTTP service to 350,000 California locations. Following the restructuring, Frontier adopted a fiber-first strategy that aligns with Commission goals of promoting widespread access to high-speed broadband.[26]

2. Verizon Broadband Network Overview

Verizon's history in California's broadband market demonstrates a fluctuating commitment to FTTP. Beginning in 2005, Verizon began deploying its FTTP service,

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[22] See Exhibit C-8 "Frontier Narrative Response to Cal Advocates Data Request 1" at 4; Exhibit C-9 "Frontier Response to Cal Advocates Data Request 1 Question 39"; Exhibit C-10 "Calculations DR 1.39"at lines 28 and 27.

[23] See Exhibit C-8 "Frontier Narrative Response to Cal Advocates Data Request 1" at 4; Exhibit C-9 "Frontier Response to Cal Advocates Data Request 1 Question 39"; Exhibit C-10 "Calculations DR 1.39"at line 25.

[24] To be defined as broadband, speeds must meet a minimum of 100 Mbps download and 20 Mbps upload speeds; See Attachment B.

[25] See Exhibit C-8 "Frontier Narrative Response to Cal Advocates Data Request 1" at 4; Exhibit C-9 "Frontier Response to Cal Advocates Data Request 1 Question 39"; Exhibit C-10 "Calculations DR 1.39"at lines 35 and 36.

[26] Joint Applicant's Testimony of Allision M. Ellis at 8.

(Fios) within the state, signaling an initial investment in advanced broadband access.[27] However, this commitment was short-lived. In 2010, Verizon announced it would stop further Fios expansion, and in 2016, the company sold its California wireline operations, including the Fios network, to Frontier.[28]

Now, as Verizon seeks to re-acquire the network, the company has provided no concrete plans to expand its existing fiber footprint. Instead, Verizon is prioritizing FWA expansion, evidenced by its aggressive 5G FWA campaign. Since its launch in 2021, Verizon has surpassed its FWA subscription targets, and the company plans to further accelerate this growth by doubling its subscriber base and expanding coverage by 50% by 2028.[29]

Currently, Verizon provides broadband service to most major cities in California via the 5G and 4G LTE network that it shares with its mobile wireless customer base. Verizon's FWA service is available to approximately **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** residential and non-residential locations.[30] As of June 2024, Verizon had **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** active FWA subscriptions in California, an 80-fold increase from the **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** subscriptions in 2021.[31] Verizon's focus on FWA, rather than fiber expansion negatively impacts the long-term quality, reliability, and capacity of broadband access for California consumers because of FWA's inherent limitations.[32]

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[27] See Exhibit C-2 Network Exam Phase I Report at 431.

[28] See Exhibit C-11 "Wall Street Journal: Verizon to End Rollout of FiOS".

[29] See Exhibit C-7 "Verizon Press Release Oct 2024".

[30] See Exhibit C-12 "Verizon's Narrative Response to Cal Advocates Data Request 4," Question 4.1.

[31] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02"; Exhibit C-13 "Verizon Response to Cal Advocates Data Request 2 Question 1" at lines 21 and 27.

[32] Opening Testimony for Verizon (Tom Nugent) at 6; See Exhibit 14 "Benton Institute Fixed Wireless Tech Suitability Report 2022-06" at 1.

B. General Order 133-D Metrics Applied to Broadband

Although General Order 133-D establishes crucial service quality metrics and reporting for traditional telephone service, the Commission has not yet adopted specific broadband standards. Consequently, this analysis applies the comprehensive and readily-applicable framework of GO 133-D metrics to evaluate broadband service quality.[33] The five key performance metrics that are relevant to broadband include: (1) Installation Interval, (2) Installation Commitments, (3) Customer Trouble Reports, (4) Out of Service (OOS) Repair Intervals, and (5) Answer Time.[34] Failure to meet these minimum service standards indicates substandard service quality and a violation of Commission rules.

Frontier and Verizon have a history of not meeting GO 133-D voice standards, and Commission records indicate a similar pattern of underperformance when the standards are applied to broadband. Specifically, testimony from the 2015 Frontier acquisition of Verizon's assets proceeding, which focused on broadband service quality between 2012 and 2014, revealed that the Verizon does not meet Commission standards in several key areas such as Installation Commitments, Installation Intervals, and OOS Intervals.[35] Furthermore, the CPUC Network Exam conducted between 2010 and 2019 also highlighted performance gaps, notably showing deficiencies in restoration of outages within 24 hours for both Verizon and Frontier voice services. Notably, the Network Exam documents that upgrades to FTTP results in better service quality performance in "virtually every category" related to service quality.[36]

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[33] Cal Advocates recommends extending the existing service quality standards to wireline broadband service. See Opening Comments in Order Instituting Rulemaking Proceeding to Consider Amendments to General Order 133 (R.22-03-016) at 21. (Cal Advocates Opening Comments in Service Quality Proceeding).

[34] CPUC General Order 133-D.

[35] See Exhibit C-4 "A.15-03-005 Adam Clark Testimony" at III-10.

[36] See Exhibit C-2 Network Exam Phase I Report at 283 ("lower numbers of Trouble Reports…higher percentages of out-of-service conditions that are being resolved within 24 hours, and…average durations are in all cases decidedly shorter."); Exhibit C-3 Network Exam Phase II Report at 244.

The following subsections provide an examination of Frontier and Verizon's compliance with GO 133-D when applied to broadband services from 2021 through 2024. The data shows a persistence of service quality issues and raises serious concerns about the Joint Applicants' ability to consistently deliver reliable service that meets regulatory standards without concrete future fiber build-out plans.

1. Frontier and Verizon continue to fall short of the Commission's 24-hour standard for restoring service outages.

The Joint Applicants exhibit significant broadband reliability challenges, particularly concerning legacy copper infrastructure. Frontier struggles to meet the 24-hour restoration standard for outages, with its copper network disproportionately contributing to total outages, and long outage durations. Verizon's FWA service, relying on its mobile wireless network, also demonstrates increasing outages and difficulty meeting Commission restoration standards. Both Verizon and Frontier's historical performance proves FTTPs superior reliability over copper, supporting the need to prioritize FTTP deployment to ensure reliable broadband access in California.

a) Frontier struggles with significant service disruptions, and restoring outages within 24 hours, especially on its copper network.

Analysis of Frontier's trouble reports, and network availability data reveals persistent reliability issues, characterized by a substantial increase in service disruptions and restoration times exceeding the Commission's 24-hour standard. Notably, the copper network, despite its smaller customer base, accounts for a disproportionately high number of outages with restoration times double those of fiber.

GO 133-D requires telecommunications providers to monitor and report voice service outages affecting residential and small business customers. These reports are known as Out-of-Service (OOS) Repair Intervals that track the average duration of outages, from customer initial report to service restoration, and the percentage of OOS repairs completed within 24 hours. The Commission standard is for a minimum of 90%

of outages to be restored within 24 hours.[37] Cal Advocates, utilizing data provided by Frontier, extended the application of these metrics to assess broadband service disruptions and outages across Frontier's FTTP and copper network. The findings of this analysis are presented in this section.

Frontier identifies broadband service disruptions through two primary methods. First, customers directly contact Frontier to report service affecting and outage issues that generate trouble tickets.[38] Second, automated network monitoring systems, overseen by Frontier's Network Operations Center (NOC), continuously track broadband performance, often detecting and reporting disruptions before customers even notice. These automated systems track and report major service interruptions (MSI), which are aggregated to determine a network's overall availability rate.[39]

Analysis of Frontier's data between May 1, 2021, and June 30, 2024,[40] demonstrates a steady increase in the total number of trouble tickets from **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** in 2021 to **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** in 2023, indicating a rise in service disruptions, including outages.[41] The average duration of these incidents, on an annual basis, increased from **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** hours in 2021 to **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** hours in 2023,

[37] GO 133-D §3.4 c.

[38] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19.

[39] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 11 and 12 at 9.

[40] Cal Advocates requested data for 2019 to 2024. Frontier only provided post-bankruptcy data.

[41] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19; Exhibit C-17 "Frontier Response to Cal Advocates Data Request 2 Question 28-A (Trouble Tickets)"; Exhibit C-18 "Calculations FTR 2.28-A," in Pivot Table 4.

and decreased to **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** hours in 2024, as seen in Table 1.[42]

Table 1: Frontier's Trouble Ticket Report Data, May 2021 through June 2024[43]

<<BEGIN FRONTIER CONFIDENTIAL>>

[redacted]

<<END FRONTIER CONFIDENTIAL>>

During the same period Frontier consistently failed to meet the minimum standard of restoring 90% of customers reported service disruptions and outages within 24 hours,[46] on an annual basis, and monthly, as shown in Figure 1. Frontier only restored roughly **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** of these service disruptions within 24 hours, falling significantly short of the required Commission standard.

[42] Data date range is from January 1st, 2024, to June 30th, 2024. 6 months.

[43] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19; Exhibit C-17 "Frontier Response to Cal Advocates Data Request 2 Question 28-A (Trouble Tickets)"; Exhibit C-18 "Calculations FTR 2.28-A," in Pivot Tables 1 and 2.

[44] Data date rage is from May 1st, 2021 to December 31st, 2021. 8 months.

[45] Data date range is from January 1st, 2024, to June 30th, 2024. 6 months.

[46] Duration repair outages exclude Sundays and federal holidays, catastrophic events and widespread outages.

Figure 1: Frontier's Customer Reported Service Disruptions and Outages Restored under 24 hours, May 2021 through June 2024[47]

<<BEGIN FRONTIER CONFIDENTIAL>>



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Frontier's ability to restore customer-reported outages is substandard. However, their performance varies significantly based on both reporting methods and technology. Specifically, analysis of "Data" outages extracted from Frontier's Network Availability data indicates that internally reported incidents are resolved within 24 hours at a significantly higher rate than outages reported directly by customers, 84% versus 32%.[48]

This data also shows a substantial disparity between copper and fiber in terms of total outages, average duration and restoration times within 24 hours, reflecting problems with the reliability of copper-based services. For example, **<<BEGIN FRONTIER CONFIDENTIAL>>** [redacted] **<<END FRONTIER CONFIDENTIAL>>** of outages between May 2021 and November 2024 were on copper networks, with restoration times double those of fiber. This discrepancy is visualized in Table 2, which illustrates the total number of outages for each technology alongside their respective average duration.

[47] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19; Exhibit C-17 "Frontier Response to Cal Advocates Data Request 2 Question 28-A (Trouble Tickets)"; Exhibit C-18 "Calculations FTR 2.28-A," in Pivot Table 1.

[48] See Table 1 and Table 3 for 2024.

Table 2: Frontier Internal Reported Outages and Average Duration in Hours, May 2021 through November 2024.[49]

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Network data further reveals Frontier's persistent challenge in meeting the Commission's standard of restoring 90% of outages within 24 hours, with compliance achieved in only two reported months. This difficulty is largely attributable to the notably lower compliance rates associated with copper technology compared to FTTP, as detailed in Table 3. Specifically, between 2023 and 2024, copper outage restoration times consistently fell short of the 90% under 24-hour standard. In contrast, FTTP demonstrated a substantially higher level of performance, meeting this standard in 15 out of the 23 reported months, highlighting its inherent advantages in ensuring superior service reliability and overall quality.

[49] Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 11 and 12 at 9; Exhibit C-19 "Frontier Response to Cal Advocates Data Request 2 Question 12."; Exhibit C-20 "Calculations FTR DR 2.12," in "Outages and Duration by Tech" tab.

Table 3: Frontier Outages Restored Under 24 Hours by Technology, Jan 2023 through Nov 2024.[50]

<<BEGIN FRONTIER CONFIDENTIAL>>



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The disparate outage totals, average duration and restoration times under 24 hours between technologies are also observed in Frontier's overall network availability data, which measures the percentage of time a network is operational and free from outages or failures.[51] Specifically, Frontier's copper network has been inconsistent and showing a

[50] Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 11 and 12 at 9; Exhibit C-19 "Frontier Response to Cal Advocates Data Request 2 Question 12."; Exhibit C-20 "Calculations FTR DR 2.12," in "Table 3 OOS 24 Hrs." tab.

[51] Network availability excludes scheduled downtime for the purpose of performing maintenance or upgrading network systems.

year-over-year decline. In contrast, Fiber's network availability consistently remains above the 99.98% mark, see Figure 2.

Figure 2: Frontiers Network Availability, May 2021 through November 2024[52]

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Overall, Cal Advocates evaluation of Frontier's broadband service reliability as detailed in Figures and Tables 1 through 3 yielded two important findings: a lack of capacity to resolve customer-reported issues in a timely manner and significant disparities in service quality performance between fiber and copper customers. Customer-reported trouble tickets have increased substantially, with restoration times consistently failing to meet the 24-hour restoration standard. Most concerning, DSL copper service, despite comprising only 7% of Frontier's network,[53] accounts for a disproportionately large percentage of its outages, and these outages take twice as long to resolve compared to fiber. This serves as evidence of severe reliability issues associated with the aging copper infrastructure. Notably, copper network outages are more frequent and take significantly longer to restore than fiber outages.

[52] Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 11 and 12 at 9; Exhibit C-19 "Frontier Response to Cal Advocates Data Request 2 Question 12."; Exhibit C-20 "Calculations FTR DR 2.12," in "Network Availability by Tech" tab.

[53] See Frontier Broadband Network Overview at I-7.

These findings show persistent challenges in Frontier's service reliability, particularly concerning its copper infrastructure and its responsiveness to customer-reported disruptions. Given Frontier's historically poor broadband service performance over its copper network, the Commission should require the Joint Applicants to commit to FTTP deployment to eliminate disparities and improve overall service reliability. Replacing the aging and unreliable copper infrastructure with FTTP is essential to ensure consistent and high-quality broadband service for Californians within the affected service territory.

b) NORS data shows inconsistent wireless reliability affecting Verizon FWA, and a failure to restore NORS outages within 24 hours.

The application of FCC Network Outage Reporting System (NORS) data to GO 133-D reveals a trend of increasing wireless outages since 2019 with Verizon consistently failing to meet the Commission's 24-hour restoration target. Furthermore, historical records show Verizon struggled with lengthy DSL outages compared to its reliable Fios fiber service during its ownership of the affected wireline network. Verizon's FWA substandard reliability is a risk considering Verizon's planned expansion and reinforces the critical need for FTTP deployment to ensure stable California broadband.

Verizon states that outage reports provided for voice services (NORS) **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>**[54] Therefore, to evaluate FWA outages against GO 133-D's OOS repair interval standards (average duration and 90% 24-hour restoration), the FCC's NORS data for Verizon's mobile wireless network was analyzed.[55]

[54] See Exhibit C-6 "Verizon Narrative Response to Cal Advocates Data Request 2," Question 16 at 24, and Questions 24 at 30.

[55] NORS mandates that telecommunications providers report significant service disruptions lasting 30+ minutes, triggered by impacts to 911, large user bases, or exceeding 900,000 user minutes.

NORS data reports **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** Verizon network outages in California between January 2019 to June 2024[56] with **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>**being wireless.[57] A snapshot of total outages, average duration and numbers of users affected is shown in Table 4. Since 2019, The number of outages and users affected has been increasing and is on pace to maintain the trend in 2024.[58] The average duration of outages has consistently been above 24 hours, ranging from a high of **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** hours to a low of **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** hours in 2024, with a decreasing trend since 2021. The percentage of NORS outages resolved within 24 hours has consistently fallen below the 90% target.

Table 4: Verizon Wireless NORS Outages Data, January 2019 through June 2024[59]

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[56] See Exhibit C-6 "Verizon Narrative Response to Cal Advocates Data Request 2," Question 16 at 24, and Questions 24 at 30; Exhibit C-21 "Verizon Response to Cal Advocates Data Request 2, Question 16".

[57] 2,869 (36%) outages were wireline/fiber outages for Verizon Business entity customers.

[58] Only 6 months of data for 2024.

[59] See Exhibit C-6 "Verizon Narrative Response to Cal Advocates Data Request 2," Question 16 at 24, and Questions 24 at 30; Exhibit C-21 "Verizon Response to Cal Advocates Data Request 2, Question 16"; Exhibit C-22 "Calculations VRZ DR 2.16" under Pivot Table 1 and Pivot Table 2 tabs.

The shared spectrum infrastructure supporting Verizon's FWA service suggests that customers experience similar outage patterns observed on the broader wireless network. Consequently, anticipated increases in user density on the shared spectrum will further negatively affect long-term service reliability.

In terms of overall network availability, Verizon reports a **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** uptime for its C-band spectrum on the 5G network, corresponding to a **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** downtime, which is comparable to Frontier's FTTP network availability.[60] However, Verizon did not provide requested network availability data for its mmWave spectrum and 4G LTE networks, citing it as out of scope and burdensome, despite providing it for C-band.[61] Given that Verizon customers generally connect to the 5G network only 7.7% of the time, with the remaining connectivity occurring on the 4G LTE network, the actual availability and performance of Verizon's aggregated network is unknown.[62]

While Verizon does not have a widespread wireline network for residential consumers in the state, a previous examination of its broadband performance in California from 2012 to 2014 showed the company had difficulty restoring outages under 24 hours on its copper DSL networks. Specifically, Verizon's DSL network experienced **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** times more outages that were **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>** times longer than outages on its Fios network. While Verizon consistently met the 24-hour repair standard for Fios outages, restoring **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END**

[60] See Exhibit C-23 "Verizon Narrative Response to Cal Advocates Data Request 2 Supplement," Question 8 at 13.

[61] See Exhibit C-24 "Verizon Narrative Response to Cal Advocates Data Request 5" Question 2 at 8.

[62] See Exhibit C-25 "Open Signal Mobile Network Experience Report July 2024" at 25.

VERIZON CONFIDENTIAL>> within that timeframe, it failed to meet the standard for DSL, restoring only **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** in 2013 and **<<BEGIN VERIZON CONFIDENTIAL>>** [redacted] **<<END VERIZON CONFIDENTIAL>>** in 2014.[63]

Analysis of Verizon's reliability in past and present demonstrates difficulty in dealing with service disruptions and outages on its non-fiber networks. The increasing frequency and duration of major wireless outages, as evidenced by FCC NORS data, coupled with the company's struggle to consistently meet 24-hour restoration standards, shows significant issues with the FWA networks' reliability. Furthermore, Verizon's historical performance with the same copper infrastructure it seeks to re-acquire from Frontier shows a clear pattern of outage issues. The clear contrast between Verizon's past DSL outage problems and its reliable Fios FTTP service strongly suggests that fiber remains the superior and more dependable broadband service through the years. Any reliance on and expansion of FWA will produce broadband reliability problems for California consumers. Promoting FTTP deployment is crucial for ensuring high quality and reliable broadband access in the state.

2. Verizon and Frontier both meet lenient Customer Trouble Report standards while Verizon's copper customers report nearly double the trouble reports compared to fiber.

Customer Trouble Reports (CTRs) are a key metric for assessing service quality, measuring the frequency that customers report problems with their service. As detailed below, both Frontier and Verizon generally easily meet current voice CTR metrics when applied to broadband service suggesting the standard is too generous. Furthermore, Verizon's data reveals a substantial disparity in CTR rates between its copper and FTTP broadband services. The CTR rate for copper-based services is nearly double that of FTTP services, demonstrating a significantly higher incidence of customer-reported problems on copper lines.

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[63] See Exhibit C-4 "A.15-03-005 Adam Clark Testimony" at III-21.

a) While Frontier technically meets the lenient Customer Trouble Report benchmark, there is a rising trend in trouble tickets signaling declining service quality.

Between 2021 and 2024, Frontier maintained its monthly CTR rates under the Commission's lenient 6% benchmark.[64] However, while remaining below the threshold, the number of monthly trouble tickets and the percentage of trouble tickets per total number of subscriptions has been increasing steadily.

The CTR metric measures the percentage of total working phone lines experiencing service-affecting and outage issues, reflecting customer dissatisfaction.[65] GO 133-D establishes a standard of no more than 6% of working lines (for units with 3,000 or more working lines)[66] having trouble reports every month. For the purposes of this analysis, broadband subscribers are used as a proxy for "working lines."

Due to the absence of required CTR reporting for broadband, Frontier's trouble ticket data and monthly subscription data were used to calculate CTR rates. For the period of May 1, 2021, through June 30, 2024, the average monthly number of broadband-affecting customer trouble reports received by Frontier was divided by the total subscriptions for the corresponding year. The resulting trouble report rates for Frontier's broadband subscribers during this period are represented in Table 5.

[64] While Frontier and Verizon would generally be in compliance with this metric if it were applied to broadband, it's worth noting, as Cal Advocates has done in the past, this is a generous standard that is not difficult to meet. See Cal Advocates Testimony on Service Quality and 9-1-1 (A.20-05-010) at page 9.

[65] See GO 133-D, § 3.3 a.

[66] Because broadband networks lack direct equivalents to the exchanges or wire centers used in traditional telephony, the entire broadband network will serve as the reporting unit.

Table 5: Frontier Customer Trouble Ticket Reports, May 2021 through June 2024[67]

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Since May 2021, Frontier has consistently met the GO 133-D Standard for Customer Trouble Reports with CTR rates mostly remaining below 3%.[68]

While Frontier has met the CTR metric, the Commission should recognize its leniency when evaluating overall service quality and consider modifying the standard.[69] The D.13-03-023 mandated Network Exam concluded that Commission CTR standards are overly generous, consistently met by carriers, with even the poorest performing wire centers remaining well below limits,-and potentially allowing up to 72% of Frontier's customers to experience annual trouble issues without violation.[70] This high threshold fails to capture repeat trouble reports, rendering the standard ineffective in ensuring acceptable service quality. Therefore, Frontier's compliance with the CTR standard should be given less weight compared to their poor performance on more stringent metrics like OOS Repair Intervals.

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[67] See Table 1 for "Trouble Tickets" data. "Avg Monthly Trouble Tickets" is calculated as the total annual trouble tickets divided by the number of reported months (8 for 2021; 6 for 2024). "Total subscriptions" is the average total subscriptions for each year. See from Exhibit C-26, "Frontier Response to Cal Advocates Data Request 2 Question 1." Also see Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3".

[68] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19; Exhibit C-17 "Frontier Response to Cal Advocates Data Request 2 Question 28-A (Trouble Tickets)"; Exhibit C-18 "Calculations FTR 2.28-A," under "CTR 6% Standard" tab.

[69] Cal Advocates Opening Comments in Service Quality Proceeding at 4.

[70] See Exhibit C-2 Network Exam Phase I Report at 525.

b) CTR rates in New York show Verizon copper networks having double customer trouble reports compared to its fiber network.

Like Frontier, Verizon's CTR rates for voice services in New York remain compliant, with both copper and fiber networks falling below the state's threshold. However, there is a significant disparity in service quality between copper and fiber networks. Copper networks exhibit nearly twice the customer trouble report rate of fiber networks, reflecting the greater reliability and performance of fiber infrastructure.

Given the absence of a Verizon fixed wireline network in California, and the necessity to assess Verizon's service quality performance, the analysis focuses on Verizon's New York CTR data, as submitted in its Service Quality Improvement Plan (SQIP). In New York, Verizon's SQIP mandates that each Central Office Entity (COE) CTR rate must be below 5.5%, and at least 85% of COEs must maintain a CTR rate below 3.3% monthly.[71] These metrics are only applied to Verizon's 'core customers' voice services. Analysis of New York CTR data provided by Verizon from January 2022 to November 2024 indicates overall compliance with the SQIP standards (Fig. 3).

[71] See Exhibit C-27 "Verizon Service Quality Report"; As of March 31, 2021, 4.3% of Verizon's total access lines, were "core" customers i.e., Lifeline, whitespot (those who lack competitive wireline alternatives to Verizon), and special needs (elderly, blind, disabled etc.).

Figure 3: Verizon New York Customer Trouble Reports for Voice by Technology, January 2022 through November 2024[72]

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Figure 3 shows copper and fiber network CTR rates remain below the state's 5.5% threshold. Furthermore, the consistently low CTR rates, below 2.0% for both copper and fiber, suggest that well over 85% of COEs meet the 3.3% threshold. However, there is a significant disparity between copper and fiber network performance. Copper networks exhibit nearly twice the CTRs of fiber networks, averaging 1.33% compared to fiber's 0.69%.[73] Furthermore, the third quarter 2024 SQIP report shows that 7.0% of Verizon's COEs failed to meet the threshold, with these COEs typically being small, primarily copper-based, and serving rural or seasonal population areas.[74]

The performance gap between Verizon's copper and fiber voice networks in New York further supports FTTP infrastructure as having overall superior reliability and customer experience. Considering that Verizon's voice and broadband services share the same infrastructure, it follows that broadband CTR rates would mirror this disparity not just in New York but also California. Consequently, prioritizing and incentivizing FTTP

[72] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02" Question 6 at 14; Exhibit C-28 "Verizon Response to Cal Advocates Data Request 2 Question 6".

[73] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02" Question 6 at 14; Exhibit C-28 "Verizon Response to Cal Advocates Data Request 2 Question 6".

[74] See Exhibit C-27 "Verizon Service Quality Report" at 4.

deployment as a condition for transaction approval would be an important step in improving service quality for the affected territory.

3. Both Frontier and Verizon exhibit broadband installation deficiencies impacting customers.

Installation intervals track the time it takes to activate new customer broadband services. Data on broadband installation intervals indicates that Frontier's average installation time for FTTP and DSL services is longer than the Commission's standard, and intervals for DSL installations are increasing. Conversely, Verizon's FWA self-installation process results in a shorter average installation interval, though a notable percentage of customers require subsequent technical assistance. This suggests that Frontier is not installing broadband services in a timely manner, and both companies' processes present potential customer inconvenience.

a) Frontier has consistently failed to meet the 5-day installation standard, with increasing installation times particularly affecting copper DSL customers.

From 2021 to 2024, Frontier failed comply with the Commissions installation interval standard for every reported month. Furthermore, Frontier's average installation interval increased substantially during this period, meaning customers are waiting a lot longer to have broadband services installed, which suggests potential issues with the condition of the copper infrastructure or the equitable allocation of technician resources.

GO 133-D sets an installation interval standard of 5 days for telephone services. An installation interval is the number of business days it takes a service provider to install the new service, starting on the date the service order was placed and ending on the date the service becomes operational.[75] Frontier's broadband installation performance, measured by the weighted average installation interval across its three California subsidiaries for residential and business services from May 2021 to June 2024, consistently failed to meet the Commission's 5-day standard as depicted in figure 4.[76]

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[75] See GO 133 SS 3.3.1 (b) Installation Interval.

[76] These are unadjusted figures. Weekends and holidays are not excluded.

Figure 4: Frontier Broadband Service Installation Intervals, May 2021 through June 2024[77]

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Furthermore, the graph shows Frontier's average installation interval increasing from 7 days in May 2021 to 10.4 days in June 2024, meaning customers are waiting an average of 3 days longer for broadband service installation today than they were 3 years ago.

When Frontier installation intervals are broken down between fiber installations and copper installations, it becomes evident that the overall increase in installation interval is driven by an increase in days Frontier takes to install copper DSL services. While fiber installation intervals have been stable averaging 10 days, Table 6 shows that copper intervals have increased substantially, and even doubled between 2021 and 2023.

[77] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 14 and 12; See Exhibit C-29 "Frontier Response to Cal Advocates Data Request 2 Question 14"; Exhibit C-30 "Calculations FTR DR 2.14" under "Frontier SIIs" tab.

Table 6: Frontier Yearly Average Service Installation Intervals by Technology, May 2021 through June 2024[78]

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The increasing installation intervals for copper reflect degradation of service quality for DSL subscribers compared to fiber. While neither is broadband service provided to customers in a timely manner, it is evident that DSL customers are faring worse.[79]

b) Verizon's Installation Intervals for FWA show evidence of challenges with self-installation procedures despite being below the five-day standard.

Based on limited information provided by Verizon, its FWA service appears to meet the Commission's 5-day installation interval standard, averaging service activation in four days. However, a substantial number of customers require subsequent technical assistance from Verizon with self-installation procedures, reflecting inconveniences for customers with the process.

Verizon's FWA service relies on customer self-installation, eliminating technician visits and scheduled appointments. Therefore, Verizon claims the traditional "installation

[78] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 14 and 12; See Exhibit C-29 "Frontier Response to Cal Advocates Data Request 2 Question 14"; Exhibit C-30 "Calculations FTR DR 2.14" under "SIIs by Tech" tab.

[79] It is important to note that broadband installations require customer to be present, therefore install appointments are usually set by the customer.

interval," which measures the time between ordering service and activation, is not relevant in this case, as installation is at the customer's discretion.[80] Despite this difference, Cal Advocates still applied the Commission's 5-day GO 133-D telephone installation standards to Verizon's FWA broadband services in the state.

According to Verizon, FWA service is typically activated within four days of order placement, broken down into two days for equipment shipment and two days for customer activation, a timeframe consistent with Commission standards. Despite compliance, a notable percentage of customers, 5,000 to 9,000 per month, required installation assistance from customer support, indicating potential difficulties with the self-installation process.[81]

4. Neither Verizon nor Frontier met the Commission's 95% Installation Standard, although fiber installations came closest to achieving compliance.

Both Frontier's and Verizon's installation commitment rate fell below the Commission's 95% standard. Frontier data shows a significant disparity between fiber and copper installations while Verizon's FWA installation rates were the worst of the three technologies. Data indicates that fiber customers experience substantially higher on-time service order completion rates in comparison to other technologies.

GO 133-D establishes a service installation commitment standard, mandating that telephone providers fulfill at least 95% of their installation commitments.[82] This standard, calculated by comparing completed installations to missed commitments, serves as a key performance indicator (KPI) for evaluating the reliability and efficiency of service provisioning. Cal Advocates applied this standard to broadband services by analyzing orders and installation data provided by Frontier.

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[80] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02" Question 15 at 23.

[81] See Exhibit C-31 "Verizon Narrative Response to Cal Advocates' Data Request 3," Question 9 at 14; Exhibit C-32 "Verizon Response to Cal Advocates' Data Request 3 Question 9".

[82] GO 133-D Installation Commitments.

The analysis revealed a significant shift in service demand between May 1, 2021, and June 30, 2024. During this period, orders for copper-based broadband services declined by nearly 90%, while orders for FTTP services increased by over 80%.[83]

Regarding installation commitment performance, Frontier provided their own KPI data that measured the percentage of service technician arrivals within the scheduled appointment window for service installations. After applying the Commission's standard to the KPI figures, Frontier failed to meet the 95% commitment rate between May 1, 2021, to June 30, 2024.[84]

However, a disaggregated analysis of installation performance reveals a substantial difference between copper and fiber installation commitments. On a yearly average, fiber installations saw a commitment fulfillment rate approximately 20% higher than copper installations.[85] This suggests a notable difference in Frontier's ability to meet promised installation timelines, with fiber customers experiencing much greater customer service in this regard. On a monthly basis fiber service installations come much closer to compliance with Commission standards, with several months coming close to the 95% commitment rate while commitment rate for copper installation consistently falls below 80% and reaches as low as 50% as seen in Figure 5.

[83] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 13 at 11; See Exhibit C-33 "Frontier Response to Cal Advocates Data Request 2 Question 13."

[84] See Attachment B "Frontier Installation Commitments by Technology".

[85] See Attachment B "Frontier Installation Commitments by Technology".

Figure 5a: Frontier Monthly Service Installation Commitment Rates, from June 2021 to July 2024[86]

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Verizon also provided data for service orders received and service orders met for its FWA broadband service in California showing installation commitment rates far below the Commission's 95% standard. Commitment rates for residential FWA service orders generally fall between 60% and 70%, far below Frontier fiber and DSL.

[86] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1," Question 8 at 7. "See Exhibit C-34 "Frontier Response to Cal Advocates Data Request 2 Question 8."; Exhibit C-35 "Calculations FTR DR 2.8" under "Frontier Installs by Tech" tab.

Figure 5b: Verizon Monthly Service Installation Commitment Rates January 2021 to May 2024[87]

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Frontier FTTP's superior performance in meeting the Commission's 95% service installation commitment standard supports the need for expanded fiber deployment to improve overall service quality. The only way to address the substantial performance gap affecting copper DSL and FWA customers is by guaranteeing fiber deployment through conditions to ensure equitable broadband provisioning as outlined by Cal Advocates witness Lucas Duffy.[88]

5. Frontier fails to answer customer calls within reasonable timeframes, as Verizon demonstrates better responsiveness, albeit for a limited number of customers.

Frontier consistently fails to meet GO 133-D customer call Answer Time standards, with over half of the past eight years showing substandard performance. Despite a significant decrease in call volume, customer wait times have drastically

[87] See Exhibit C-23 "Verizon Narrative Response to Cal Advocates Data Request 2 Supplement" Question 14 at 17; Exhibit C-47 "Verizon Response to Cal Advocates Data Request 2 Question 14"; Exhibit C-48 "Calculations VRZ DR 2.14".

[88] See Cal Adv.-02: Testimony of Lucas Duffy: Executive Summary of Cal Advocates Testimony & Proposed Transaction Conditions.

increased. Conversely, Verizon's data indicates compliance with New York State service standards but only reflects a small fraction of their total customer base.

a) Despite fewer calls, Frontier's customer wait times are significantly longer, failing to meet the Commission's Answer Time standard.

From 2017 to 2024, Frontier failed to meet the Commission's Answer Time standard in 48 out of the 93 reported months. As of recently, Frontier has not met the standard since October 2023. Notably, the number of seconds required for customers to reach a live agent has increased substantially despite the total number of calls decreasing, reflecting a trend of degradation in customer service for customers.

The GO 133-D Answer Time metric tracks how quickly telephone providers respond to customer calls about billing and repair issues. The goal is to answer at least 80% of calls within 60 seconds, whether customers reach a live agent directly or after navigating an automated system.[89] Although the standard currently applies to telephone companies, Frontier does not have separate customer contact numbers for broadband and telephone services, therefore Answer Time metrics apply to all Frontier services. Frontier submits quarterly reports to the Commission on their monthly performance for Answer Time.

Frontier's monthly Answer Time figures fell significantly short of the 80% within 60 seconds standard, more than half of the reported months in the last eight years as shown in Figure 6.

[89] GO 133-D SS 3.3.5 Answer Time.

Figure 6: Frontier Customer Calls Answered Within 60 Seconds, (2017-2024)[90]

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Furthermore, the total call seconds customers spend waiting to reach an agent have increased by over 9000% from 2017 to 2024, despite a 72% decrease in total calls over the same period. This dramatic increase in wait-times despite a declining call volume highlights a serious and worsening issue in Frontier's customer service responsiveness to customer billing and repair inquiries.

Table 7: Frontier Answer Call Metrics Aggregated Annually (2017-2024)[91]

	Total # of Calls for TR, Billing & Non-Billing	Total # of Call Seconds to Reach Live Agent	Percent Under 60 Seconds	Months in Compliance
2017	3,105,489	2,850,135	71%	4
2018	2,153,062	1,973,829	62%	0
2019	1,249,260	1,175,556	76%	8
2020	1,651,081	49,437,573	93%	12
2021	1,196,541	32,709,779	90%	12
2022	1,134,730	239,930,811	70%	4
2023	962,925	115,174,093	77%	5
2024	881,644	267,564,710	62%	0

[90] Exhibit C-36 "Exhibit C-36 GO-133D Answer Time Metrics".

[91] Exhibit C-36 "Exhibit C-36 GO-133D Answer Time Metrics".

While Frontier's call answer time performance has generally been substandard since 2017 (excluding 2020 and 2021), their 2024 performance is particularly poor. They did not meet the 60-second answer time standard in any reported month, averaging just 62%. Calculations based on the total call seconds to reach a live agent, and the total number of customer calls indicate an average wait time of approximately five minutes in 2024 compared to two minutes in 2023.

Frontier's persistent non-compliance, along with drastically increasing wait times not only reveal a severe deficiency in their customer support but also inflict significant frustration upon customers reliant on this essential public utility.

b) Verizon's meets New York Answer Time Standards but data is limited.

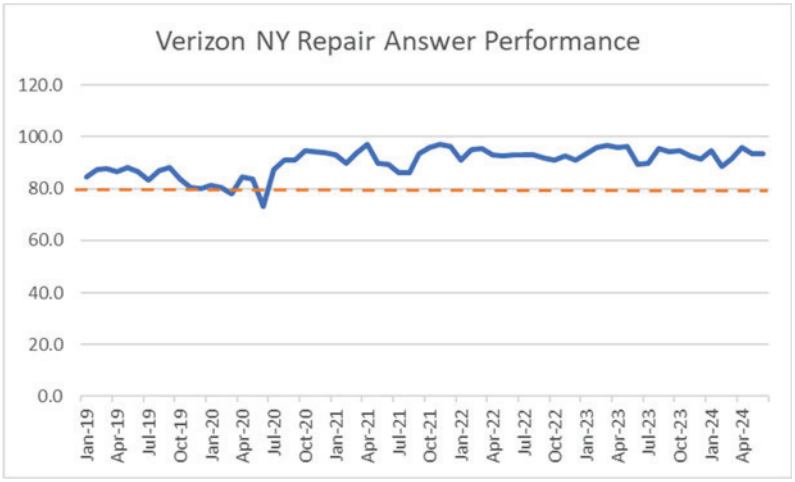
Verizon's New York customer repair call Answer Time data shows overall compliance with NY service standards, with over 80% of calls answered within 30 seconds. However, this data represents only a small fraction of Verizon's total customer base.

Given the absence of a Verizon fixed wireline network in California, and the necessity to assess Verizon's service quality performance on customer calls, the following analysis focuses on Verizon's New York Repair Answer Time Performance data, as submitted in its SQIP. In New York, the Service Standards specify that each month, 80% or more of the calls to an answer center should be answered within 30 seconds.[92] These metrics are only applied to Verizon's 'core customers' who call for repairs.[93] Analysis of New York Repair Answer time data provided by Verizon from January 2019 to November 2024 indicates overall compliance with the New York SQIP standards. Except for March and June 2020, all months in the reported period are above 80% standard.

[92] See Exhibit C-27 "Verizon Service Quality Report".

[93] See Footnote 70.

Figure 7: Verizon NY Answer Time for Repairs, Jan 2016 through May 2024[94]



Although Verizon demonstrates adherence to New York's service quality standards, the data presented in Figure 7, it encompasses only approximately 4% of the state's total access lines including only Lifeline and special needs customers.[95] While the provided data is valuable for assessing service to this critical demographic, it does not offer a comprehensive view of Verizon's overall call answering performance across its entire customer base and should not be interpreted as evidence of broader service quality.

Overall, Cal Advocates believes that fiber deployment is essential to address the disproportionate number of outages, installation problems, and customer complaints originating from the copper network, which likely contribute to the high call volumes that cause significant delays and their failure to meet answer time standards.

This section examined the quality of Frontier and Verizon by applying the standards of General Order 133-D, which traditionally applies to telephone service, to broadband service. The analysis reveals a persistent pattern of service quality issues for both companies, including a high number of outages and trouble reports, particularly on copper networks, and failures to meet installation metrics and answer time standards.

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[94] See Exhibit C-6 "Verizon Response to Cal Advocates Data Request 02" Question 19 at 27. See Exhibit C-37 "Verizon Response to Cal Advocates Data Request 02 Question 19."

[95] See Exhibit C-27 "Verizon Service Quality Report".

These findings align with historical records of the Joint Applicants' inability to consistently deliver reliable broadband service that meets Commission standards. The data supports the need for improvements in service quality, particularly for copper-based services, and highlights the importance of prioritizing and incentivizing fiber technology deployment to enhance the overall customer experience. Furthermore, it is well documented that fiber's presence improves copper network service quality.[96] Therefore, while fiber deployment should be prioritized, maintaining copper service quality until the final FTTP transition remains essential.

C. Broadband Service Quality Metrics Beyond GO 133-D

The Commission's GO 133-D standards do not fully capture the nuances of broadband-specific issues such as data speed and network congestion. To provide a more comprehensive evaluation of broadband service quality, this analysis also incorporates additional service quality metrics, including delivered speeds, latency, and packet loss. These standards are well-established and widely used in the telecommunications industry to assess the quality of networks. These metrics have been used in FCC programs such as Measuring Broadband America (MBA) and are supported by standard-setting bodies such as the International Telecommunications Union (ITU-T).[97] Cal Advocates have also recommended the adoption of these metrics for the Commission to measure service quality for broadband given their ability to reflect customer experience.[98]

[96] See Exhibit C-2 Network Exam Phase I Report at 283; Exhibit C-3 Network Exam Phase II Report at 244.

[97] ITU-T (2007) Recommendation G.1050: Network Model for Evaluating Multimedia Transmission Performance over Internet Protocol.

[98] Cal Advocates recommends extending the existing service quality standards to wireline broadband service. See Cal Advocates Opening Comments in Service Quality Proceeding at 21.

1. Frontier's FTTP exceeds FCC speed standards while DSL fails, and Verizon's FWA, though generally meeting speed requirements, is inconsistent for many subscribers.

The FCC currently defines broadband as "advanced telecommunications capability" with minimum speeds of 100 Megabits per second (Mbps) download and 20 Mbps upload (100/20 Mbps)[99] for fixed service.[100] To assess whether the Joint Applicants meet this standard, Cal Advocates analyzed both Frontier and Verizon's service offerings, considering the principle that higher percentages of delivered network speeds indicate higher quality service. This analysis shows that while Frontier fiber broadband is capable of delivering speeds well beyond 100/20 Mbps, its copper DSL services are failing to meet the FCC definition of broadband. Verizon's FWA services in California generally meet the FCC speed requirements for many users but still fall short of the standards for about a third of subscribers.

a) Frontier Fiber speeds exceed FCC Standards while DSL speeds fail.

Frontier FTTP broadband has capabilities to exceed FCC speed standards. These capabilities are generally matched by the actual delivered speeds as measured by the FCC's MBA program. However, copper DSL services deliver significantly lower capable speeds, with a substantial portion failing to meet the FCC's standards. Actual delivered speeds to customers are critically deficient, with most connections experiencing rates below 25/3 Mbps.

Frontier has broadband services available at varying speeds depending on the technology available at a given location. According to the most recent FCC Broadband Data Collection (BDC) filings, customers have access to FTTP service with advertised download speeds up to 5,000 Mbps/5,000Mbps (5 Gigabits per second (Gbps)

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[99] Hereinafter, two values separated by a slash ("/") are used as shorthand for download/upload speeds in Megabits per second. For example, 25/ 3 Mbps refers to 25 Mbps download and 3 Mbps upload.

[100] "Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion", 2024 Section 706 Report, GN Docket No. 22-270, Federal Communications Commission, ¶¶ 24-27 (Adopted Mar. 14, 2024, Released Mar. 18, 2024).

symmetrical), while those with copper DSL connections have access to advertised speeds ranging from 10/1 Mbps to 115/12 Mbps.[101] Currently, over 99.97%[102] locations offering FTTP have advertised speeds at or above the FCC's 100/20 Mbps benchmark while none of the copper DSL locations have access to this minimum combined download/upload speed capability.[103]

To further evaluate deployment figures, Optical Line Terminal (OLT) and Digital Subscriber Line Access Multiplexer (DSLAM) reports provide insights into the capacity of Frontier's network infrastructure. OLT reports provided by Frontier show that their fiber optic network has equipment that supports speeds up to 200Gbps, and that the average provisioned speed is 20Gbps.[104] This is well above the FCC's 100Mbps download benchmark. However, the DSLAM reports show a different picture for DSL. While the fiber-based backhaul network that aggregates individual DSLAM terminals can reach upload speeds of up to 10 Gbps, individual DSLAM terminals can only deliver speeds at a maximum of 115/12 Mbps.[105] This indicates that Frontier's current DSL infrastructure cannot physically meet the FCC's download and upload speed standards without significant equipment upgrades.

It is important to note that these reports reflect the maximum capabilities of the OLT and DSLAM equipment. The actual speeds that customers experience may vary depending on several factors, such as the distance from the terminals, the type of equipment they are using, and the number of people using the network at the same time.

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[101] See Attachment B.

[102] FCC National Broadband Map, Data by Provider. Provider name: Frontier Communications Corporation

Link: https://broadbandmap.fcc.gov/data-download/data-by-provider?version=jun2024.

[103] See Attachment B.

[104] Exhibit C-38 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 4" Question 10 at 4. See Exhibit C-39 "Frontier Response to Cal Advocates Data Request 2 Question 10-A".

[105] Exhibit C-38 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 4" Question 10 at 4. See Exhibit C-40 "Frontier Response to Cal Advocates Data Request 2 Question 10-B".

Therefore, it is essential to evaluate broadband service quality based on actual delivered speeds, not just advertised speeds. Data from the FCC's MBA Report for 2023 reveals that Frontier's fiber optic service delivers 100% of its advertised speeds for the 500 Mbps tier.[106] This suggests that Frontier's fiber network infrastructure has the potential to deliver high performance at lower fiber tiers as well.

While Frontier offers fiber services that largely meet advertised broadband speeds, a significant performance disparity exists within its legacy copper-based DSL network. Specifically, lower-speed DSL tiers consistently underperform, delivering actual speeds substantially below advertised rates. This discrepancy is clearly illustrated in Table 8, which compares advertised and actual speeds for both DSL and fiber offerings across various speed tiers. Notably, Frontier's DSL services achieve only 86 to 91% of advertised speeds. Given that 83% of Frontier's locations with DSL have speeds as low as 10 Mbps, a substantial portion of these customers are likely to experience significantly degraded service.[107] Consequently, these subscribers, already on the slowest tiers, are further disadvantaged by reduced bandwidth, hindering their ability to effectively utilize online services.

Table 8: Frontier Advertised Vs. Actual Speeds[108]

ISP Speed Tier	Advertised Download Speed (Mbps)	Download Median Speed (Mbps)	Median Actual Speed / Advertised Speed (%)
Frontier DSL - 12 Mbps	12	10.41	86.73
Frontier DSL - 18 Mbps	18	15.54	86.31
Frontier DSL - 24 Mbps	24	21.89	91.19
Frontier Fiber - 500 Mbps	500	500.15	100.03

[106] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 48, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

[107] See Attachment B.

[108] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 48, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

Frontier's FTTP, with its strong capacity to deliver high-speed broadband and consistently meet advertised speeds and FCC standards, stands in stark contrast to its DSL service, with speed limitations and inconsistencies that fail to meet FCC standards. This disparity highlights the critical need for prioritizing fiber optic deployment to provide all customers with reliable, high-speed broadband that not only meets FCC benchmarks but also addresses everyday practical consumer needs.

b) While most Verizon FWA locations meet FCC speed standards, a significant portion of customers receive substandard speeds.

While a majority of Verizon's FWA locations in California are advertised at speeds exceeding the FCC's 100/20 Mbps standard, a significant portion receive lower speeds that do not meet the standards of modern broadband. In terms of delivered speeds compared to advertised speeds, Verizon meets its own targets for lower tiers but struggles to consistently deliver advertised speeds at higher tiers. Verizon acknowledges the shortcomings of FWA, including the potential for service quality degradation as user density increases.[109] These findings demonstrate the inherent limitations of FWA compared to fiber and its inadequacy as a sustainable broadband solution.

To determine whether Verizon's FWA network meets the 100/20Mpbs standard, FCC deployment data was analyzed and found the following figures shown in Table 9.

Table 9: Verizon FWA Download/Upload Speeds Deployed[110]

Advertised Speeds (UL/DL)	# of Locations	% of Verizon's FWA Network
10/1 Mbps	587376	16%
50/5 Mbps	496560	13%
200/30 Mbps	175584	5%
300/20 Mbps	2376171	63%
400/40 Mbps	41235	1%
1000/75 Mbps	85781	2%

[109] Opening Testimony for Verizon (Tom Nugent) at 7.

[110] FCC National Broadband Map, Data by Provider. Provider name: Verizon. State: California Link: https://broadbandmap.fcc.gov/data-download/data-by-provider?version=jun2024.

Verizon's FWA broadband in California has locations with speeds ranging from 10/1 Mbps to 1000/75 Mbps. While 71% of locations are advertised at speeds that exceed the FCC's 100/20 Mbps standard, nearly a third do not. Specifically, a significant number of locations have speeds offered as low as 10/1 Mbps and 50/5 Mbps, highlighting how FWA, in some instances, is inadequate for providing even modern standard broadband, and certainly not future proof broadband.

As mentioned above, the speeds available to customers do not equate to speeds delivered or experienced. Verizon self-monitors service quality in terms of speed by setting expectations for certain speed tiers. Verizon's target is that at least 75% of delivered speeds are at or above advertised speeds.[111] Verizon exceeds its own performance metrics for its lower speed tiers of 25/4 Mbps via its LTE network, and its 50/5 and 85/10 Mbps tiers via its 5G service. However, its most popular speed tier of 300/25 Mbps has trouble meeting performance targets. Specifically, mmWave 5G Home + service shows performance barely meeting or below the 75% target for nearly every month from December 2023 to November 2024 as shown below.

Table 10: Verizon's mmWave 5G Home+ 300/25 Mbps
75% Delivered Speed Target Performance Metrics[112]

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Verizon struggling to meet their performance targets for higher speeds reflects the limitations of FWA services compared to FTTP. While FTTP easily can deliver

[111] See Exhibit C-6 "Verizon Response to Cal Advocates Data Request 02" Question 11 at 19. Exhibit C-41 "Verizon Response to Cal Advocates Data Request 02 Question 11".

[112] See Exhibit C-6 "Verizon Response to Cal Advocates Data Request 02" Question 11 at 19. Exhibit C-41 "Verizon Response to Cal Advocates Data Request 02 Question 11".

advertised speeds of 500/500 Mbps, FWA struggles to consistently deliver speeds at 300/25 Mbps. While data shows that Verizon can consistently deliver download speeds at tiers below 100Mpbs, it is unclear what the actual delivered speeds are for customers subscribing to faster speed tiers.

It is also important to note that Verizon sets a low target at 75% that FTTP easily surpasses with rates of 100%. These limitations are well known within the telecommunications industry and Verizon recognizes that FWA provides a broadband service that is lower quality than fiber service and that its capacity is limited with its growth.[113] As more users are added to the spectrum that FWA relies on to deploy broadband, speeds will be impacted, and service quality will only deteriorate from this already mediocre benchmark. Therefore, to ensure California consumers receive the utmost benefit from the Proposed Transaction, the Commission must impose conditions to accelerate fiber deployment.

2. FTTP outperforms with low latency and packet loss, DSL suffers under load, and FWA shows signs of congestion.

While broadband speed is often the focus of consumers, latency and packet loss are critical for real-time applications like video conferencing. Even with a fast broadband connection, high latency or significant packet loss severely degrades user experience because of data transmission delays.[114] Therefore, optimal network performance requires low latency and minimal packet loss. Findings demonstrate that FTTP exhibits low latency, and minimal packet loss, producing a high-quality broadband experience. Latency is significantly higher under load for DSL and experienced the highest packet loss, highlighting its susceptibility to congestion. Verizon's self-reported FWA performance data indicates a trend of increasing latency, particularly for its 5G network, likely due to increasing user subscriptions and network congestion. Findings support

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[113] Joint Applicant's Opening Testimony of Debra Aron at 25; Opening Testimony for Verizon (Tom Nugent) at 7.

[114] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 10, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

FTTPs superiority for high bandwidth applications and suggest that FWA's long-term viability is challenged by increasing congestion, while DSL is fundamentally unsuited for demanding real-time applications.

a) FTTP provides a lag-free experience with minimal latency and packet loss, while DSL users endure delays and disruptions particularly during peak usage.

Frontier's FTTP performance consistently meets FCC latency and packet loss standards, maintaining low latency even under load. DSL, however, experiences significantly increased latency under load and higher packet loss. For FTTP consumers, this means a lag-free experience, particularly for real-time applications like video calls and gaming, while DSL users face significant delays and disruptions, especially during peak usage.

Latency is the duration (in milliseconds) for a data packet to travel across a network. Packet loss measures instances where transmitted data fail to reach its destination or experiences excessive delay.[115] In its technology transition program, the FCC has established specific performance standards for these metrics, grounded in ITU-T recommendations for sound network management: latency of 100 milliseconds (ms) or less for 95% of peak period measurements, and packet loss of no more than 1% for packet-based networks.[116]

The latest FCC MBA report tested several ISPs for packet loss and latency under both idle and under load conditions. Under idle conditions, Frontier met latency standards, remaining under 100ms with FTTP consistently outperforming DSL. The median latency for Frontier's DSL was measured at approximately 23ms, whereas the FTTP median latency was roughly 7ms, demonstrating that FTTP is more than three times lower in latency. Under downstream and upstream loads, FTTP latency remains

[115] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 10, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

[116] FCC 16-90, para. 94, 95, at 33-34.

stable and below 100ms while DSL latency significantly increases. The report shows DSL latency between 60ms and 100ms at downstream loads and well above 100ms and up to 700ms for upstream loads for all DSL ISPs, including Frontier.[117] At these levels of latency, consumers are experiencing degradation of their online experience, resulting in noticeable delays, buffering, and unresponsiveness across a wide range of internet activities.

The MBA report also shows 4% of Frontier's DSL subscribers experience packet loss of 1% or higher, while only 1% of their FTTP subscribers encounter packet loss at that level.[118] These figures suggest that Frontier's FTTP service generally adheres to industry standards while DSL has more challenges.

Overall Frontier's FTTP ability to consistently meet industry latency and packet loss standards across all measured conditions reflects its high performance and superior service quality. Frontier's DSL performance highlights its vulnerability to network congestion and poor service quality. This disparity underscores the superior reliability and stability of FTTP for latency-sensitive applications such as video conferencing, telemedicine and online learning.

b) Verizon fiber latency and packet loss are above FCC standards while FWA struggles to meet internal performance latency standards for all spectrums.

The MBA report shows Verizon's latency and packet loss performance for its FTTP services above industry standards. In contrast, Verizon's internal data for its FWA demonstrates a persistent struggle to achieve target latency for its highest 5G FWA speed tiers, with performance degrading over time.

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[117] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 10 and Chart 7, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

[118] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 19, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

Latency and packet loss performance were evaluated against both the FCC's 100ms standard and Verizon's internal performance targets. For FTTP services, the FCC's MBA report was utilized. For FWA services, Verizon's self-reported latency performance reports for California were analyzed.

The MBA report shows Verizon's FTTP median latency under all conditions including idle, downstream and upstream loads, were measured under 100ms. Specifically, Verizon's idle latency was approximately 10ms. Under load, like other fiber services in the study, it remained stable and under 100ms.[119] In terms of packet loss, the vast majority of Verizon's fiber subscribers experience packet loss below 0.4%, with only 1% experiencing packet loss between 0.4% and 1%. Verizon's FTTP exhibits no instances of packet loss exceeding 1%, consistently meeting industry standards and indicating a highly reliable and stable connection, particularly beneficial for real-time applications.[120]

Verizon's internal FWA performance standards require 75% of 5G services to achieve latencies below 30ms, and LTE services to achieve latencies below 100ms.[121] Reports show that between December 2023 and November 2024, its LTE services at speeds of 25/4 Mbps had latency under 100ms 100% of the time, meeting both FCC and Verizon's own internal targets. In its faster 5G speed tiers, internal latency performance targets are more difficult to meet. Most notable is the increasing latency for Verizon's C-Band 5G Home offerings in Northern California between December 2023 and November as shown in Table 11.

[119] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at Charts 6 and 7, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

[120] FCC, Thirteenth Measuring Broadband America Fixed Broadband Report at 19, https://data.fcc.gov/download/measuring-broadband-america/2023/2023-Fixed-Measuring-Broadband-America-Report.pdf.

[121] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02" Question 11 at 19. Exhibit C-41 "Verizon Response to Cal Advocates Data Request 02 Question 11".

Table 11: Verizon Northen California C-Band 5G Latency under 30ms.[122]

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As of November 2024, latency has increased for many Verizon customers using the services listed in Table 11. Specifically, approximately one-third of these Verizon FWA customers are experiencing latencies exceeding 30ms. Although within FCC standards, latency above 30ms reflects inferior performance compared to fiber. Furthermore, as Verizon 5G home internet adoption grows, network congestion will likely worsen, exacerbating the trend of increasing latency for all FWA service plans.

Overall, broadband latency and packet loss are a critical factor for important real-time applications like video conferencing, telemedicine, and online learning. Fiber services consistently demonstrated the ability to deliver the lowest latency and packet loss. DSL connections, while demonstrating acceptable idle latency, suffered significant increases under load, and higher packet loss exceeding FCC standards and highlighting their unsuitability for latency-sensitive applications. Verizon's FWA performance reflected its vulnerability to its own growth with latency degrading over time due to increasing network congestion. These findings support the role of fiber optic infrastructure as the sole technology capable of delivering reliable and consistent low-latency internet access, crucial for supporting vital services and promoting digital equity.

D. Verizon and Frontier Customer Satisfaction

Cal Advocates analyzed Net Promoter Scores (NPS) used in the telecommunications industry and customer complaint data to determine the level of

[122] See Exhibit C-6 "Verizon's Narrative Response to Cal Advocates' Data Request 02" Question 11 at 19. Exhibit C-41 "Verizon Response to Cal Advocates Data Request 02 Question 11".

customer satisfaction among Frontier and Verizon customers. These metrics serve as direct indicators of customer dissatisfaction, highlighting specific service deficiencies and providing quantifiable measures of each company's service quality.

1. Frontier Customer Satisfaction is highest among fiber customers.

Frontier's customer satisfaction data reveals major disparities between their copper DSL and FTTP broadband services. Fiber services consistently achieve high customer satisfaction scores while copper services show a clear downward trend. This trend aligns with Frontier's customer complaint data, which shows a growing number of complaints, with copper-related issues consistently outweighing fiber. These findings support the need to address copper service challenges and prioritize investment in fiber infrastructure to improve overall customer satisfaction.

Frontier monitors customer satisfaction as part of its Above Customer Expectations ("ACE") program.[123] This program measures customer experience on Frontier services and technical support using a customer survey format to create a "Net Promoter Score" or "NPS". The NPS is then calculated by subtracting the percentage of Detractors from the percentage of Promoters. In the telecommunications industry, an NPS of 31 is considered average, while scores above 50 and 80 represent excellent and world-class performance, respectively.[124] This analysis compares Frontier's NPS on installations and repairs against the industry average to assess overall customers satisfaction.

Analysis of Frontier's NPS data from June 1, 2021, to July 31, 2024, shows substantially stronger customer satisfaction with FTTP services and repairs compared to copper DSL. Fiber installations and repairs received consistent customer satisfaction scores across the reported period with NPS in the low 70s for installs. In contrast, customer satisfaction with copper services shows a clear downward trend with NPS

[123] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 7 at 6.

[124] "Telecom NPS Benchmarks and CX Trends in 2023: NPS in Telecoms", Neos Networks, https://neosnetworks.com/resources/blog/why-nps-scores-matter-in-telecoms/.

scores for installations declining 41.9. NPS scores for repairs have fluctuated below the industry average between 17.1 and 29.0 as shown in Table 12.

Table 12: Frontier Customer Satisfaction Scores by Technology for Installations and Repair Services, June 2021 through July 2024.[125]

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Another method of measuring customer satisfaction is via consumer complaints. Analysis of Frontier's customer complaint data from June 1, 2021, to June 30, 2024, presents similar trends to those found in NPS data. The total number of complaints has steadily increased each year, with the first six months of 2024 already exceeding the total for the entire year of 2021 as shown in Table 13. Furthermore, complaints related to copper services consistently outnumber those for fiber, at a rate of nearly 2 to 1. Specifically, 55% of complaints were from copper customers, 35% from fiber customers, and the remaining 10% were unknown.

[125] See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 8 at 7; Exhibit C-34 "Frontier Response to Cal Advocates Data Request 2 Question 8"; Exhibit C-35 "Calculations FTR DR 2.8" under "KPI NPS" tab.

Table 13: Frontier Customer Complaints by Technology
May 2021 through June 2024[126]

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A clear contrast exists between Frontier's fiber and copper services, as evidenced by NPS data and increasing copper-related complaints. In order to increase customer satisfaction rates and decrease customer complaints with broadband, the Commission should address the challenges of legacy copper infrastructure by imposing conditions that improve copper DSL which can only be done by replacing it with fiber.

2. FWA Customer Satisfaction rates reflect the efforts of Verizon to promote their new technology.

Verizon provided data on overall customer satisfaction from 2019 to 2024 for its Fios FTTP and FWA broadband services. Verizon FTTP services' customer satisfaction scores have fluctuated over time with periods of both growth and decline but around the industry average. Conversely, since its introduction in Q3 2022, FWA's NPS customer satisfaction scores have been steadily increasing, reflecting Verizon's focus on this new technology over FTTP.

Verizon, like Frontier, utilizes the NPS to gauge customer satisfaction of its broadband services, including FTTP (Fios) and FWA.[127] Data shows Verizon's Fios NPS, fluctuating between 22 and 35 from Q3 2019 to H2 2024, with an average score of

[126] See Exhibit C-15 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 3," Question 28 at 19. Exhibit C-42 "Frontier Response to Cal Advocates Data Request 2, Question 28-B"; Exhibit C-43 "Pivot Table FTR DR 2.28-B".

[127] See Exhibit C-6 "Verizon Narrative Response to Cal Advocates Data Request 2" Question 32 at 37.

29.6, short of the industry average. In comparison, its FWA NPS has an upward trend, increasing from 32 in Q3 2022 to 40 in H2 2024, with an average of 36.8 since Q3 2022 as shown in Table 14. Neither service has consistently achieved scores above 50, which is considered excellent, nor approached the world-class benchmark of 80.

Table 14: Verizon Customer Satisfaction (NPS Scores) by Technology, Q3 2019 through H2 2024.[128]

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The increasing customer satisfaction scores for FWA and steady decline beginning Q2 2022 likely reflects Verizon's increasing investment and promoting of this new technology, potentially at the expense of its FTTP service and customer experience. Therefore, conditions to invest in fiber are essential to the approval of the Proposed Transaction to ensure the promotion of FWA does not come to the detriment of the California fiber network service and overall customer satisfaction.

[128] See Exhibit C-6 "Verizon Narrative Response to Cal Advocates Data Request 2" Question 33 at 39; Exhibit C-44 "Verizon Response to Cal Advocates Data Request 2 Question 33".

III. IMMEDIATE TRANSACTION IMPACTS ON SERVICE QUALITY

A. Ensuring Service Continuity: Learning from the 2016 Verizon-Frontier Transition to Safeguard California Consumers

To prevent the recurrence of the major service quality failures directly resulting from the 2016 Verizon-Frontier transition, the Commission should impose transition-specific conditions on the Proposed Transaction. The Commission should implement proactive measures to ensure a seamless and reliable transition, thereby safeguarding the public interests and maintaining essential communication services.

The Commission has the authority and responsibility to ensure that telecommunications mergers and acquisitions do not adversely affect service quality for consumers, particularly those in vulnerable populations.[129] Historical data and the past performance of telecommunications companies during transition periods provide insights that can inform Commission decisions and conditions aimed at preventing future service disruptions.

The 2016 transition from Verizon to Frontier resulted in a period of significant service disruptions, lasting approximately six weeks, and marked by a surge in customer complaints. These disruptions had severe consequences across multiple sectors. Public safety was compromised when the Glendora police department lost service, necessitating the transfer of 911 calls to another department.[130] There were economic impacts with businesses unable to process essential credit card transactions. Furthermore, vulnerable populations, particularly elderly individuals relying on landlines for medical needs, were

[129] California Code, Public Utilities Code - PUC § 854.

[130] Assembly Committee on Utilities & Commerce "Frontier Telecommunication Transition Briefing Paper" at 1. Link: https://autl.assembly.ca.gov/sites/autl.assembly.ca.gov/files/Frontier%20Hearing%20Briefing%20Paper.pdf.

placed at heightened risk due to service outages.[131] The LA Times reported issues of up to six months post-transition citing 2,131 transition-related complaints compared to 151 complaints for a competitor.[132]

It is estimated that around 1% of former Verizon customers lost service during the transition nationwide, with several thousand of these customers in California.[133] The CPUC Consumer Affairs Branch received 867 complaints, representing a five-to-ten-fold increase compared to typical complaint volumes.[134] These incidents collectively underscore the profound impact of poorly executed infrastructure transitions, highlighting failures in both planning and execution. Analysis of news reports and hearing transcripts reveals that these disruptions were primarily attributed to data migration errors and inadequately trained transition staff.[135]

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[131] California State Assembly, Utilities and Commerce Standing Committee, "Assembly Informational Hearing on Frontier Telecommunications Transition," May 18, 2016. Link: https://calchannel.granicus.com/player/clip/3723?view_id=7&redirect=true; Meg James, "Lawmakers slam Frontier for bad phone and Internet service," Los Angeles Times, May 18, 2016, https://www.latimes.com/entertainment/envelope/cotown/la-et-ct-frontier-puc-verizon-switch-20160518-snap-story.html; Jon Brodkin, "Nightmarish transition from Verizon to Frontier has no end in sight", Ars Technica (May 5, 2016, 12:17 PM), https://arstechnica.com/information-technology/2016/05/frontier-outages-persist-35-days-after-switch-from-verizon/; Hetty Chang, "California Woman Frustrated With Frontier Verizon Switch Says Problems Persist", NBC Los Angeles (May 3, 2016, 6:23 PM), https://www.nbclosangeles.com/news/woman-frustrated-with-fontier-verizon-switch-says-problems-persist/74722/.

[132] David Lazarus, "Column: Frontier still struggling to put Verizon takeover issues to rest", Los Angeles Times (Oct. 7, 2016), https://www.latimes.com/business/lazarus/la-fi-lazarus-frontier-communications-update-20161003-snap-story.html.

[133] Jon Brodkin, "Frontier: Fewer than 30,000 customers lost service in Verizon transition," Ars Technica, May 13, 2016. Link: https://arstechnica.com/information-technology/2016/05/frontier-fewer-than-30000-customers-lost-service-in-verizon-transition/.

[134] Assembly Committee on Utilities & Commerce "Frontier Telecommunication Transition Briefing Paper" at 1. Link: https://autl.assembly.ca.gov/sites/autl.assembly.ca.gov/files/Frontier%20Hearing%20Briefing%20Paper.pdf; California State Assembly, Utilities and Commerce Standing Committee, "Assembly Informational Hearing on Frontier Telecommunications Transition," May 18, 2016 at 01:38. Link: https://calchannel.granicus.com/player/clip/3723?view_id=7&redirect=true.

[135] California State Assembly, Utilities and Commerce Standing Committee, "Assembly Informational Hearing on Frontier Telecommunications Transition," May 18, 2016. Link: https://calchannel.granicus.com/player/clip/3723?view_id=7&redirect=true.

The California State Assembly's Utilities & Commerce Committee hearing in May 2016 further highlighted the severity of the situation. During this hearing, lawmakers criticized the CPUC for insufficient oversight, with Jim Patterson stating, "This is a failure of the fundamental role and responsibility of the PUC."[136] This criticism highlights the importance of the Commission to actively intervene to prevent similar failures in future transitions.

The disproportionate impact on vulnerable populations, such as the elderly and those reliant on landlines for emergency services, supports the need for contingency planning. The potential for such disruptions to impede access to 911 services during critical events like wildfires and floods, which are increasing in frequency and severity due to climate change, further amplifies the need to ensure a seamless transition. Tim Sullivan, then Executive Director of the CPUC, acknowledged this need, stating "We should have looked at what happened in Connecticut and produced plans to avoid that in California as adversaries in the proceeding."[137]

To prevent a recurrence of the service quality failures experienced during the 2016 Verizon-Frontier transition, the CPUC should impose conditions on the proposed Verizon reacquisition. These conditions should include a phased transition with comprehensive plans submitted to the Commission by Joint Applicants, and recourse for customers affected by the transition, as described in Cal Adv.-02: Testimony of Lucas Duffy.[138] Furthermore, the CPUC must increase its oversight of the transition. By implementing the conditions, the CPUC can fulfill its obligation to protect consumers and ensure the reliability of essential communication services, particularly during critical times.

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[136] California State Assembly, Utilities and Commerce Standing Committee, "Assembly Informational Hearing on Frontier Telecommunications Transition," May 18, 2016. Link: https://calchannel.granicus.com/player/clip/3723?view_id=7&redirect=true.

[137] California State Assembly, Utilities and Commerce Standing Committee, "Assembly Informational Hearing on Frontier Telecommunications Transition," May 18, 2016. Link: https://calchannel.granicus.com/player/clip/3723?view_id=7&redirect=true.

[138] See Cal Adv.-02: Testimony of Lucas Duffy: Executive Summary of Cal Advocates Testimony & Proposed Transaction Conditions.

IV. CONCLUSIONS AND RECOMMENDATIONS

Fiber optic technology offers significant advantages over copper, FWA and any other broadband technologies. The availability of fiber and other improved options is driving widespread customer abandonment of copper-based DSL services. This decline in copper broadband subscriptions is an expected and accepted trend, reflecting the inherent limitations and deteriorating service quality of copper compared to newer technologies like fiber. While customer migration away from this antiquated legacy service is understandable, neither Frontier, Verizon, nor any other internet service provider should be permitted to abandon their copper DSL customers. Even as this technology fades, the Commission must ensure that every copper customer, down to the very last subscriber, receives a reliable service that meets established quality standards.

While FWA may offer a temporary alternative to copper DSL, its limited capacity and susceptibility to performance degradation under heavy usage restrict its viability as a long-term solution. Verizon's apparent focus on FWA as a copper replacement strategy is insufficient to address the growing broadband needs of consumers.

Ultimately, widespread fiber deployment represents the only sustainable, long-term solution. The Commission should impose conditions on Verizon mandating fiber expansion. This expansion should prioritize areas served by existing, aging copper networks and extend to currently underserved and unserved rural communities.

Ultimately, approving this transaction without requiring significant commitments to fiber optic infrastructure expansion would be a disservice to the people of California. The Commission must prioritize the long-term needs of its constituents and ensure that any transaction serves the public interest by promoting equitable access to high-quality, reliable broadband service.

ATTACHMENT A

Statement of Qualifications and Experience of Alejandra Martinez

STATEMENT OF QUALIFICATIONS AND EXPERIENCE
OF
ALEJANDRA MARTINEZ

My name is Alejandra Martinez, and I am a Public Utilities Regulatory Analyst II in the Communications and Broadband Policy Branch of the Public Advocates Office at the California Public Utilities Commission. I hold a Bachelor of Political Science from the University of La Verne and a Master of Political Science from California State University, Los Angeles. My undergraduate studies provided a strong foundation for understanding the complex regulatory landscape of the public utilities sector, while my graduate work in public policy and applied statistics has been invaluable in assessing the effectiveness of different regulatory approaches.

I began my career at the CPUC in 2011 as a Graduate Student Intern and transitioned to a full-time Public Utilities Analyst I in the Consumer Service and Information Division's Public Advisor's Office in 2012. During my time in the Public Advisor's Office, I facilitated public participation in CPUC proceedings across the state and developed informational materials to help consumers understand their rights regarding these proceedings, and the overall energy, water and telecommunications industries. I also investigated consumer complaints within the Limited English Proficient (LEP) population and oversaw the TEAM (Telecommunications Education and Assistance in Multiple-Languages) and CHANGES (Community Help and Awareness of Natural Gas and Electric Services) programs.

Since August 2024, I have served in my current role in the Public Advocates Office, where I have contributed to various proceedings, including the Service Quality Proceeding (R.22-03-016) and Carrier of Last Resort (R.24-06-012).

ATTACHMENT B

Frontier's FCC Broadband Deployment Speed Data

Attachment B: Frontier's FCC Broadband Deployment Speed Data

Frontier Max Download and Upload Speeds by Technology as of June 2024.

Technology	Technology Code	Max of max_advertised_download_speed	Max of max_advertised_upload_speed
Copper	10	115	12
FTTP	50	5000	5000
UFW	70	45	3

The table above is a pivot table generated from the most recent FCC broadband deployment data available as of June 2024. It examines Frontier's broadband speed offerings for copper DSL, FTTP and UFW. Copper DSL offerings have a maximum advertised download speed of 115 Mbps and a maximum upload speed of 12 Mbps. Given that the FCC defines broadband as requiring speeds of 100 Mbps download and 20 Mbps upload, none of the locations served by Frontier's copper DSL meet this standard due to the insufficient upload speed. Additionally, the pivot table indicates that even the advertised maximum download speed of 115 Mbps is only attainable by a small fraction (3%) of the locations served by DSL, as illustrated in the table below.

Frontier Advertised Download Speeds and Percent Distribution

Frontier Copper DSL Max Download Speeds		
Advertised Speeds	Locations	Percentage Distribution
10 Mbps	108708	83%
25 Mbps	42	0.03%
40 Mbps	3	0.002%
45 Mbps	6294	5%
70 Mbps	5048	4%
90 Mbps	5837	4%
115 Mbps	4299	3%
Total	**130231**	

Sources: FCC National Broadband Map, Data by Provider. Provider name: Frontier Communications Corporation Link: https://broadbandmap.fcc.gov/data-download/data-by-provider?version=jun2024; Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, Report, 39 FCC Rcd 3247.

ATTACHMENT C

Frontier Installation Commitment by Technology

Attachment C: Frontier Installation Commitment by Technology

Frontier Appointment Met- Install/Order Total by Tech				
	Copper	Fiber	Frontier	
6/1/2021	81.5	93.3	87.4	
7/1/2021	80.0	92.3	86.1	
8/1/2021	79.9	91.5	85.7	
9/1/2021	78.6	89.9	84.3	
10/1/2021	77.3	88.3	82.8	
11/1/2021	72.8	91.7	82.2	
12/1/2021	67.8	90.9	79.3	
1/1/2022	66.7	91.1	78.9	
2/1/2022	73.2	90.1	81.6	
3/1/2022	75.9	90.7	83.3	
4/1/2022	75.4	90.7	83.0	
5/1/2022	74.4	85.4	79.9	
6/1/2022	73.3	86.1	79.7	
7/1/2022	78.0	90.1	84.0	
8/1/2022	63.9	84.2	74.0	
9/1/2022	57.4	87.0	72.2	
10/1/2022	59.8	87.5	73.6	
11/1/2022	56.7	88.3	72.5	
12/1/2022	58.0	88.1	73.0	
1/1/2023	57.4	84.5	71.0	
2/1/2023	65.4	87.0	76.2	
3/1/2023	50.0	86.8	68.4	
4/1/2023	63.3	87.4	75.3	
5/1/2023	66.1	87.9	77.0	
6/1/2023	71.6	88.6	80.1	
7/1/2023	73.4	91.2	82.3	
8/1/2023	62.9	91.0	77.0	
9/1/2023	65.2	92.2	78.7	
10/1/2023	65.4	91.4	78.4	
11/1/2023	74.1	90.7	82.4	
12/1/2023	71.8	91.5	81.6	
1/1/2024	56.5	91.2	73.8	
2/1/2024	66.6	91.6	79.1	
3/1/2024	65.8	91.5	78.7	
4/1/2024	72.1	90.1	81.1	
5/1/2024	75.0	92.5	83.8	
6/1/2024	81.4	93.8	87.6	
7/1/2024	73.7	91.7	82.7	

Source: See Exhibit C-16 "Frontier Narrative Response to Cal Advocates Data Request 2 Part 1" Question 8 at 7; Exhibit C-34 "Frontier Response to Cal Advocates Data Request 2 Question 8"; Exhibit C-35 "Calculations FTR DR 2.8" under "Frontier Install Met" tab.