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Commissioner:	C. Rechtschaffen
Admin. Law Judge:	K. J. Bemesderfer
CalAdvocates Project Mgr.:	Shelly Lyser
CalAdvocates Expert Witness:	Cameron Reed

Public Advocates Office

California Public Utilities Commission

Public Advocates Office Testimony on Service Quality and Public Safety for the Proposed Transfer of Control of Sprint to T-Mobile

- PUBLIC -

San Francisco, California
January 7, 2019

MEMORANDUM

This report was prepared by Cameron Reed of the Public Advocates Office at the California Public Utilities Commission (Public Advocates Office or Cal Advocates) under the general supervision of Program & Project Supervisor, Shelly Lyser. Attachment A to this testimony is a statement of qualifications from Cameron Reed. The Public Advocates Office is represented in this proceeding by legal counsel, Travis Foss.

This testimony is comprised of the following chapters:

Chapter	Description
I	**Introduction**: Background information about the importance of a thorough review of the merger.
II	**Service Quality and Coverage**: A discussion about Sprint and T-Mobile's quality of service, coverage, outages, and customer satisfaction.
III	**9-1-1 Services**: A discussion about 9-1-1 services and the wireless 9-1-1 network.
IV	**Emergency Preparedness and Public Safety**: A discussion about Sprint and T-Mobile's readiness to continue service during a disaster and their ability to provide service to first responders.
V	**Conclusion:** A summary of the main points of discussion.

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SUMMARY

An essential part of the public interest review is an examination of whether the merger will maintain or improve the quality of service for California customers. The Amended Assigned Commissioner's Scoping Memo and Ruling filed October 4, 2018, (Scoping Memo) makes this requirement clear by asking what new services would arise from the merger,[1] how the merger will impact service quality,[2] and whether the benefits of the merger exceed any detriments.[3] In answering these questions, this testimony examined Sprint Spectrum L.P (Sprint), Virgin Mobile USA, L.P. (Virgin), and T-Mobile USA, Inc., A Delaware Corporation (T-Mobile) (Collectively "Applicants") claims of purported service benefits of the merger.

Key Findings:

The key findings of my review of the Applicant's existing service quality and purported service quality benefits include the following:

- Both Sprint and T-Mobile's stand-alone 5G networks will rival existing wireline networks in broadband download speeds by 2024, meeting or surpassing the 100 Megabit per second 5G standard for throughput.
- T-Mobile generally has better voice service quality, coverage, customer perception, and data speeds than Sprint.
- Sprint's service quality has been increasing each year since 2015 and Sprint is a viable carrier and market competitor.
- Sprint experiences fewer outages than T-Mobile and is more resilience to outages caused by **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**.
- Sprint and T-Mobile signed a 4-year LTE data roaming agreement, which increases the coverage for Sprint's customers independent of the merger.
- Sprint and T-Mobile follow federal guidelines for provisioning 9-1-1 service and currently provide service to California first responders and government agencies. Sprint maintains a large fleet of portable generators and has 4 to 8-hour battery back-ups on its cell sites to augment its emergency preparedness.

[1] Scoping Memo at p. 2. Question #2.

[2] *Id* at p. 3. Question #10.

[3] *Id* a p. 3. Question #14.

- T-Mobile plans to decommission approximately two-thirds of Sprint's existing cell sites, which will reduce the amount of redundant cellular infrastructure in California.

Recommendations:

The harms caused by the loss of a facilities-based provider that is a viable carrier and competitor does not outweigh the benefits of the merger. The California Public Utilities Commission (Commission) should deny the merger. If the Commission fails to deny the merger, it must implement wireless market improvements to mitigate the harms to California customers:

- Require that T-Mobile retain Sprint's customer complaint database, portable generator inventory, and back-up battery policy to maintain the quality of the wireless market.
- Require that New T-Mobile report on customer complaints, service outages, broadband speeds and latency following the merger as discussed in Attachment D to this testimony.
- Direct new T-Mobile to work with the California Office of Emergency Services (CalOES) to implement wireless Next Generation 9-1-1 services across is service territory and notify the Commission, CalOES and the Public Advocates Office of 9-1-1 outages.
- Require that New T-Mobile construct a dedicated first responder communications network to mitigate the harms of reduced redundancy in cellular infrastructure.

I. INTRODUCTION

The Scoping Memo requires a review of whether a proposed merger is within the public interest.[4] This review includes in part an examination of whether the merger would maintain or improve the quality of service and services available to California ratepayers. The Scoping Memo makes the review requirement clear by asking "[w]hat new services, if any, that are not currently provided by T-Mobile or Sprint, are contemplated to be provided by the merged entity? How would the merger impact competition for such services in any metropolitan area or other geographically distinct market?"[5] and "[h]ow would the merger impact the quality of, and access to, service to California consumers in metropolitan areas, rural areas, or other geographically distinct markets?"[6] Further, the Scoping Memo makes it clear that merger impacts on quality of service or access to new service must have benefits that outweigh the detrimental effects of the merger by asking "[w]ould the benefits of the merger likely exceed any detrimental effects?"[7]

If approved, the proposed transaction will significantly reduce wireless competition in California and consolidate an already highly concentrated industry.[8] A large majority of Californians rely on their cell phones as their primary means of voice communication, with approximately 80 percent of 9-1-1 calls originating from wireless devices.[9] Furthermore, many low-income families rely on their mobile phones to connect to the Internet at home.[10] If the merger is approved, New T-Mobile will serve approximately **<<BEGIN CONFIDENTIAL>>**

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[4] Scoping Memo at p. 2.

[5] *Id* at p. 2. Question #2.

[6] *Id* at p. 3, Question #10.

[7] *Id* at p. 3. Question #14.

[8] D.16-12-025 at p. 11. "Mobile broadband markets are highly concentrated" and at p. 74.

[9] *See* National Emergency Number Association Statistics on Call Volume at: https://www.nena.org/page/911Statistics.

[10] Approximately 31% of US households that make less than $30,000 use smart phones as their only connection to the Internet. https://finance.yahoo.com/news/study-1-5-american-homes-get-broadband-smartphones-192623829.html.

[redacted] **<<END CONFIDENTIAL>>**[11] California customers, which means the proposed transaction will have a significant impact on a large number of Californians.

The Commission should consider the ability of both companies to provide services, expand coverage, and maintain service quality and public safety absent the merger to determine whether the merger provides benefits to the public. Furthermore, due to recent advances in 5G New Radio (NR) technology, the Commission should also distinguish between potential benefits derived from new 5G technologies and benefits derived solely from the merger. This testimony will examine the above issues in detail. The Commission should adopt the recommendations discussed in the sections below to ensure that customers' service quality is maintained or improved if the Commission fails to reject the merger on the grounds of competitive harms discussed in the testimony of Dr. Lee Selwyn.[12]

[11] Confidential Appendix A to A.18-07-011.

[12] Public Advocates Office testimony of Dr. Lee Selwyn at p. viii-xvii.

II. SERVICE QUALITY AND COVERAGE

A. Introduction

Wireless service quality typically focuses on measuring how well the wireless network can establish and maintain connections for both voice and data service. The Commission can measure wireless service quality through metrics including service coverage, call drop rates, call connection rates, average data speed, and average latency.[13] Service outages also impact quality, as outages prevent customers from using wireless services at all. Customers can also express dissatisfaction with their wireless carrier through formal and informal complaints. The Commission must view Sprint and T-Mobile's service quality holistically and consider the time required to realize purported merger benefits to determine if the merger would serve the public interest.

B. While T-Mobile's Service Quality is Generally Better than Sprint's Service Quality, Sprint's Service Quality Has Improved Since 2015.

1. Sprint Customers Will Benefit from T-Mobile's Larger Service Coverage for Four Years, With or Without the Merger.

Service coverage refers to areas where wireless phone users can have enough signal strength to send and receive calls and data. The Commission has previously recognized that wireless coverage is a significant component of a customer's satisfaction with wireless service.[14] As such, examining the service coverage that Sprint and T-Mobile have before the merger is relevant to whether the merger will be in the public interest, especially considering that Sprint and T-Mobile recently signed a 4G LTE roaming agreement[15] and that a significant number of Sprint's customers have handsets that do not work on T-Mobile's network. These customers will not receive benefits until those handsets are replaced.

WhistleOut, a third-party consumer comparison website that assists consumers in selecting cell phone plans, gathers state-level information on wireless carriers' service

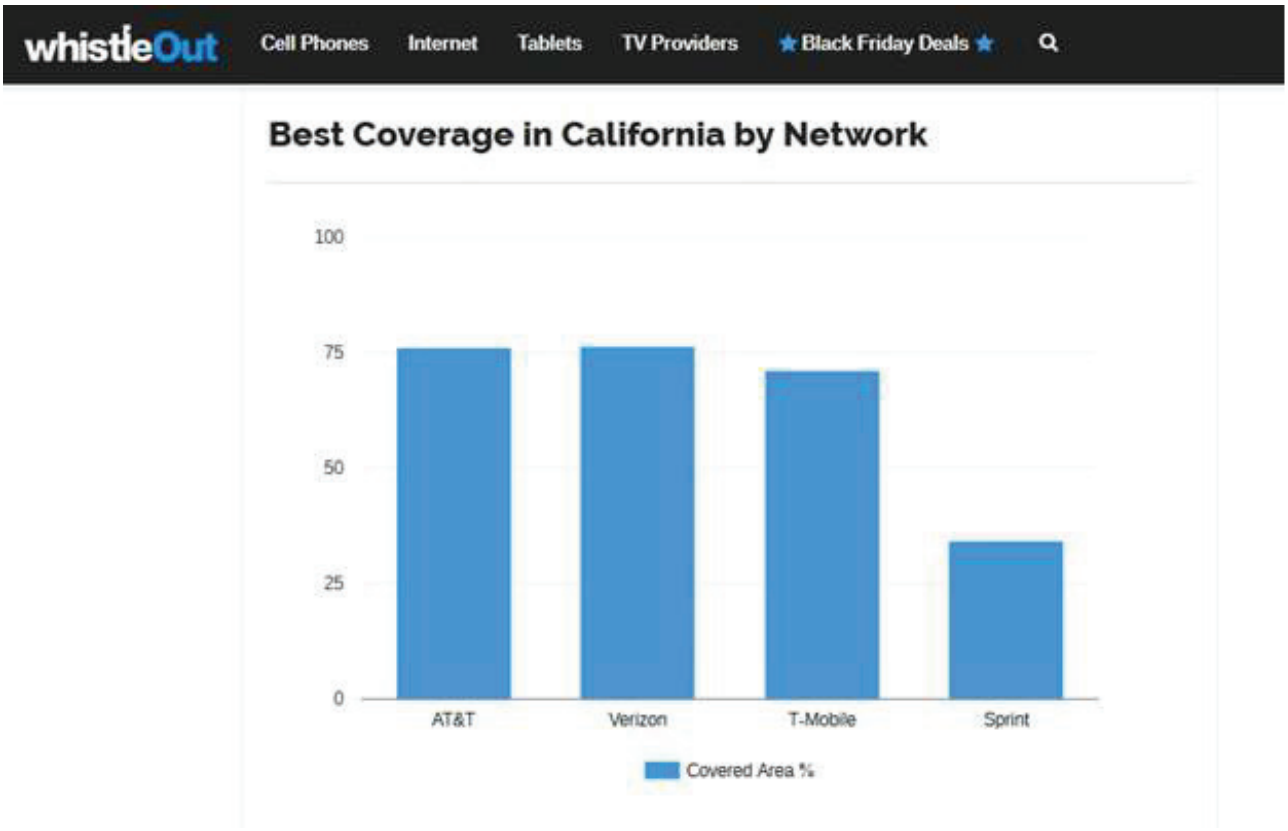
[13] Taken from What is KPI? http://www.rfwireless-world.com/Terminology/what-is-KPI.html

[14] Decision 09-07-019, at p. 75.

[15] Exhibit C-1: Fierce Wireless: Sprint's roaming agreement doesn't impact VoLTE rollout.

coverage.[16] Wireless coverage maps provided by the carriers reflect nationwide information and can include coverage provided by roaming agreements. Roaming agreements are contracts signed between cellular carriers that provide the ability for wireless customers to make and receive voice calls and use data when they travel outside of their provider's network. Roaming agreements usually involve low data caps and reduced speeds so customers benefit by having more coverage on their cellular provider's network.[17] Figure 1, which represents WhisteOut's California specific data, shows that the top three carriers provide roughly equal service coverage.

Figure 1: WhistleOut's Summary of Cell Coverage in California[18]



[16] https://www.whistleout.com/CellPhones/Guides/Best-Coverage-in-California-USA.

[17] Exhibit C-2: Sprint Roaming Agreement FAQ.

[18] https://www.whistleout.com/CellPhones/Guides/Best-Coverage-in-California-USA.

Figure 2: WhistleOut's Summary of Cell Coverage in California by Area

Coverage in California (State of 2,589 Zip Codes)

Network	Zip Codes Covered	Geographic Area Covered m^2
AT&T	1,651	120,499
Verizon	1,664	119,280
T-Mobile	1,660	113,477
Sprint	1,532	54,349

Coverage data generated July 27th 2018 from carrier maps

As Figure 1 and 2 indicate, Verizon's and AT&T's network covers approximately 76 percent of California's geographic area, where T-Mobile's network covers about 71 percent. In contrast, Sprint's network covers about 34 percent of California's geographic area.

Sprint supplements its facilities coverage footprint with roaming agreements. According to WhistleOut's coverage maps, which is included as Attachment B to this testimony, Sprint's existing coverage is located predominately in urban areas and along highways. T-Mobile's service coverage map, which is included as Attachment C, shows that T-Mobile covers more than double the geographic area of Sprint, including extending coverage to rural and sparsely populated areas. Sprint notes that it does not anticipate investing in facilities to deploy high-speed broadband service to cover significant rural areas absent the transaction.[19]

Despite Sprint's smaller geographic coverage area, Sprint still covers a significant number of people in its service area. Recent reports released by the Federal Communications Commission (FCC) estimate that Sprint covers 93 percent of total US Population (POPs) and T-Mobile covers 96.6 percent of total US POPs.[20] While Sprint has lower rural coverage than the other carriers, Sprint's urban coverage is very similar to AT&T, Verizon, and T-Mobile; which lets Sprint reach a large number of customers.

[19] Exhibit C-3 Sprint response to Cal Advocates Data Request 2, Question 2-1, 2-2, and 2-3.

[20] Exhibit C-4: FCC Wireless Appendices, Figure II.A.27 at p. 26.

i. Incapable Customer Handsets Will Increase the Amount of Time Required for Many Sprint Customers to Benefit from the Merger

In evaluating service coverage benefits claimed by the Joint Applicants as a result from the proposed merger, the Commission should consider how some of Sprint's customers are using devices that will be incompatible with T-Mobile's wireless networks. Out of Sprint's approximate **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**[21] California customers, **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**[22] have phones that will need to be upgraded or replaced before they can benefit from T-Mobile's larger service coverage area. A further **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** customers have devices that will have limited compatibility with T-Mobile's network, being able to access at least one of T-Mobile's spectrum bands. Customers with access to fewer spectrum bands could experience slower speeds or limited coverage as not every spectrum band is deployed on every cell site. This means that fewer customers would see immediate coverage benefits if the merger is approved.

The Applicants have plans to remedy the issue of device incompatibility. T-Mobile states that it faced similar issues in its acquisition of MetroPCS and managed to change customer's handsets within 26 months.[23] Sprint currently has plans to transition customers from Code Division Multiple Access (CDMA) to Voice over Long Term Evolution (VoLTE), which would make customer devices compatible with T-Mobile's network and improve customer service quality.[24] Because Sprint has plans to upgrade its customer's handsets to a VoLTE network regardless of the merger this provides a vehicle for Sprint's customers to gain increased coverage without the merger. Sprint customers will see an increase in coverage simply as a result of Sprint and T-Mobile recently signing a 4G LTE roaming agreement that will last for four years

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[21] Confidential Exhibit A to Application.

[22] Exhibit C-5: Sprint Response to Cal Advocates Data Request No. 002 Question 2-9.

[23] Public Interest Statement at p. 40.

[24] Exhibit C-6: Sprint Response to Cal Advocates Data Request No. 001 Question 1-24.

regardless of whether the merger is approved.[25] Sprint's plans to deploy VoLTE and the data roaming agreement with T-Mobile will help address Sprint's smaller coverage footprint regardless of whether the merger occurs.

2. Sprint's Call Drop Rates and Call Failure Rates Have Decreased Since 2015.

Wireless service quality uses Key Performance Indicators (KPIs) as metrics and test cases to evaluate the quality of wireless voice and broadband service. Two KPIs for voice service are Call Drop Rate (CDR) and Call Failure Rate (CFR). CDR refers to the ratio of successfully established telephone calls that are cut off due to technical issues before the speaking parties have finished their conversation and hung up, which is also referred to as dropped calls. CFR refers to the ratio of attempted calls that do not result in a connection to the dialed number; the inverse of this ratio is referred to as blocked calls. Wireless data services use similar connection drop and failure metrics.

Dropped calls and blocked calls interfere with and disrupt the customer's ability to use voices services. The fewer blocked and dropped calls occur in a network the better the service quality customers receive. Sprint and T-Mobile track the percentage of CDR and CFR that occurs on their networks.[26] Figures 3 and 4 below compare Sprint and T-Mobile's CDR and CFR by quarter respectively:[27]

[25] Exhibit C-1: Fierce Wireless: Sprint's roaming agreement doesn't impact VoLTE rollout.
[26] Exhibit C-8: Sprint Responses to Cal Advocates Data Request No. 001 Question 1-49 and Exhibit C-9: T-Mobile Response to Cal Advocates Data Request No. 004 Question 4-10. Sprint provided information from 2015 to September 2018, T-Mobile provided data from July 2017 through November 2018. T-Mobile was unable to provide information from 2015 to June 2017, stating it does not have information on its CDR and CFR prior to July 2017.
[27] The data used to make this analysis is included as Exhibit C-7: Sprint and T-Mobile's CFR and CDR.

Figure 3: Comparison of Sprint and T-Mobile's CDR for California Markets (2015-2018)

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Figure 4: Comparison of Sprint and T-Mobile's CFR for all California Markets (2015-2018)

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In both CDR and CFR, T-Mobile performs better than Sprint in the 1-year comparison window, with less dropped calls and less failed calls. However, the data shows that Sprint's service quality is also improving over time. Sprint's average CDR went from **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** Sprint's average CFR also decreased, going from **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**. These are significant gains in service quality and show that Sprint is steadily improving its voice service offerings. This is also exemplified by Sprint's commitment to rolling out VoLTE service to its customers.[28]

3. The Applicants will Provide High Average Data Speeds and Low Latency Services Independently of the Merger

Data speeds and latency are two important factors for determining wireless service quality. Data speeds refers to the average and peak download and upload throughput rates that users experience over the network, usually expressed in Mbps. Latency refers to the time it takes from when the source, such as a user or connected device, sends a packet to when the destination receives it, typically measured in ms. Faster data speeds mean files download and upload faster. Lower latency means less time is taken between a user requesting and receiving information. High latency values around 200ms can cause issues for voice and video calls by creating delay that degrades the call experience and very high latencies can cause calls to drop.

Sprint and T-Mobile track average data speeds and latency on their networks,[29] and several third parties also measure and analyze carrier speed and latency performance.[30] While 5G NR services will improve average data speeds and average latency across the industry, as discussed previously consumer adoption of 5G capable handsets will take time and the Commission should evaluate how customers will experience improvements in speed and latency

[28] Exhibit C-6: Sprint Response to Cal Advocates Data Request No. 001 Question 1-24.

[29] *Id.*

[30] Third parties such as Ookla and RootMetrics measure and analyze carrier performance in various areas. *See* RootMetrics on its methodology: http://rootmetrics.com/en-US/methodology.

from the proposed merger in a reasonable timeframe of its closing to determine if the merger has any public interest benefit for Californians.

The Commission gathers data on the mobile communications market through its CalSPEED app. This information is posted on the Commission's website, along with its reports.[31] The FCC recently summarized CalSPEED's results in a report.[32] Figure 5 is the FCC's compilation of CalSPEED's results.

Figure 5: CALSPEED estimated LTE Download and Upload Speed by Service Provider

Service Provider	Fall 2016			Spring 2017			Fall 2017		
	Mean LTE DL Speed (Mbps)	Median LTE DL Speed (Mbps)	Number of Tests	Mean LTE DL Speed (Mbps)	Median LTE DL Speed (Mbps)	Number of Tests	Mean LTE DL Speed (Mbps)	Median LTE DL Speed (Mbps)	Number of Tests
AT&T	14.04	14.40	1,517	14.90	15.49	1,517	15.50	16.75	1,552
Sprint	9.54	8.11	1,045	9.99	7.95	1,172	11.54	10.11	1,219
T-Mobile	11.97	11.27	1,216	13.20	13.01	1,419	13.08	13.00	1,488
Verizon	16.69	18.43	1,626	14.68	15.51	1,714	16.88	18.62	1,722
Total	13.50	13.70	5,404	13.44	13.31	5,822	14.49	15.38	5,981

Service Provider	Fall 2016			Spring 2017			Fall 2017		
	Mean LTE Upload Speed (Mbps)	Median LTE Upload Speed (Mbps)	Number of Tests	Mean LTE Upload Speed (Mbps)	Median LTE Upload Speed (Mbps)	Number of Tests	Mean LTE Upload Speed (Mbps)	Median LTE Upload Speed (Mbps)	Number of Tests
AT&T	6.89	6.44	1,516	7.08	6.25	1,517	7.45	6.82	1,552
Sprint	3.95	3.20	1,045	4.02	3.07	1,172	3.37	2.62	1,219
T-Mobile	7.93	8.40	1,216	8.27	7.77	1,419	8.11	7.38	1,488
Verizon	8.16	8.77	1,626	8.52	8.97	1,714	8.59	9.00	1,722

CalSPEED's rigorous data testing demonstrates that Sprint has slower download speeds than T-Mobile, and both have slower speeds than AT&T and Verizon. T-Mobile has particularly fast upload speeds, nearly matching Verizon's mean upload speeds. Sprint and T-Mobile have both increased their mean download speeds from fall 2016 to fall 2017. CalSPEED's results also

[31] The reports can be found at the following link: http://cpuc.ca.gov/General.aspx?id=1778.

[32] This report can be found here: https://docs.fcc.gov/public/attachments/DOC-355405A1.pdf.

test for Latency, and both T-Mobile and Sprint have seen significant improvements in mean latency since 2012.

Figure 6: CalSPEED Spring 2017 Report on Mean Latency

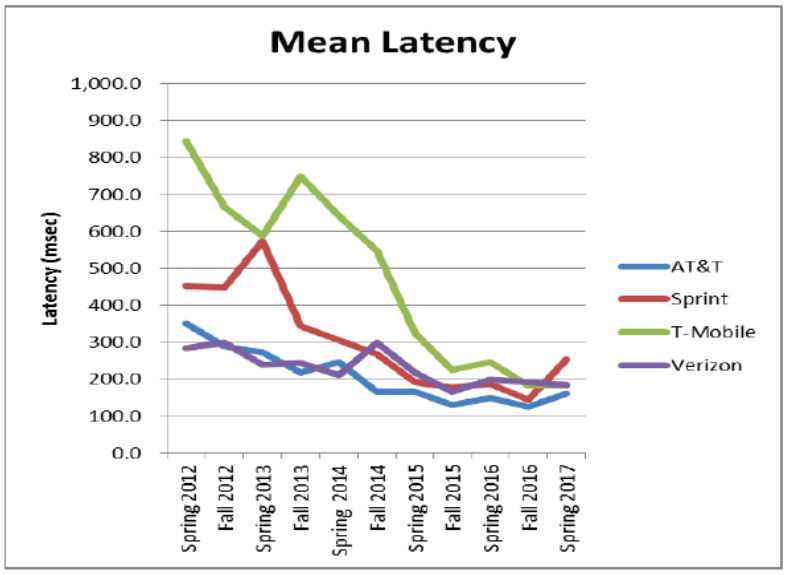

Table 1 summarizes information from CalSPEED's fall 2017 test results to further augment Figure 6.[33]

Table 1: CalSPEED Latency Results for fall 2017

Company	Average Latency (ms)
AT&T	137.01
Sprint	211.52
T-Mobile	153.54
Verizon	140.43

CalSPEED's results demonstrates that T-Mobile's Latency has improved significantly since 2012 to become roughly comparable to Verizon and AT&T's average latency. Sprint's Latency has also improved since 2012 and was similar to T-Mobile, Verizon, and AT&T's Latency in fall of 2016, but has since increased.

[33] This Information was taken from CalSPEED's published public fall 2017 Mobile Field Testing Summarized data at http://cpuc.ca.gov/General.aspx?id=1778.

The Applicants rely on third party speed testing information in their Application and declarations.[34] One of the mentioned third parties, Ookla, releases public speed tests results and ranks carriers based on its Speedscore metric.[35] Ookla's 2016 through 2018 speed test reports show that mobile speeds have increased over the past few years. Ookla has characterized the mean download speed in the US at 27.33 Mbps and that T-Mobile is providing average speeds of around 31 Mbps in urban areas of California, such as Fremont.[36] Ookla ranked T-Mobile as the fastest carrier in 2017 and 2018 and Sprint was ranked the worst. Ookla's reports demonstrate that T-Mobile is currently capable of matching the speed performance of AT&T and Verizon's networks. Ookla's information is especially relevant here because T-Mobile **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**[37] T-Mobile's internal reports for 2016 and 2017 show that **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**

The Applicants characterize the average 5G data rates the combined and stand-alone companies will offer to consumers based on network modelling. Figure 7 is a copy of the tables provided in the Application.

[34] Declaration of John C. Saw at ¶15.

[35] Ookla's reports can be found here: www.speedtest.net/reports/.

[36] Exhibit C-10: Ookla's 2018 speed test report at page 11.

[37] Exhibit C-11: T-Mobile Network Reports.

Figure 7: Applicant's National Speed Projections for 2021 and 2024.[38]

Entity	Average 5G Data Rates (Mbps)	Peak 5G Data Rates (Mbps)
T-Mobile	25	900
Sprint	55	300
New T-Mobile	149	1500

Average and Peak Data Rate Comparisons (Year 2021)

Entity	Average 5G Data Rates (Mbps)	Peak 5G Data Rates (Mbps)
T-Mobile	76	2700
Sprint	113	700
New T-Mobile	444	4100

Average and Peak Data Rate Comparisons (Year 2024)

In response to a data request, T-Mobile submitted updated projections of its stand-alone capabilities in California, which increased average and peak throughput numbers to **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>.**[39]

i. The Applicant's Network Projections Underestimate the Performance of Sprint and T-Mobile's Stand-Alone Networks

[38] Application at p. 15.

[39] Exhibit C-12: T-Mobile response to Cal Advocates Data Request No. 001 Question 1-24.

The Applicants base their network projections upon a network model purported to approximate the capabilities of T-Mobile and Sprint's stand-alone networks as well as New T-Mobile's network from 2021 through 2024. The speeds presented above in figure 7 are derived from this model. While the Applicants purport that the speed increases as benefits of the merger, major flaws in the assumptions underlying the network model invalidate the Applicants' conclusions regarding Sprint and T-Mobile's stand-alone network speeds. Specifically, the Applicants' assume unrealistic customer adoption rates of 5G devices, inflated data consumption per mobile user for both 5G and 4G service, and unreasonably constrains the amount of available 5G spectrum for stand-alone Sprint and T-Mobile.[40] T-Mobile provided the model on December 21 which did not allow adequate time to review the model in depth, so the analysis presented below focuses on the assumptions underlying the model.

First, the Applicants' network model overestimates the percentage of customers that will adopt 5G service by 2024. The model predicts that **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**, which is much higher than industry predictions of 50 percent of North American connections will be 5G by 2025, as discussed in Public Advocates Office testimony of Mr. Cameron Reed on Fifth Generation Wireless Service.[41] The network model assigns overly aggressive demand projections for 5G service and lowers the average projected data speeds for Sprint and T-Mobile's stand-alone networks.

Second, the network model overestimates the expected data consumption per mobile subscriber. The network model assumes that each subscriber would use **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**. This varies significantly from industry expectations: Cellular radio manufacturer Ericsson predicts that North

[40] Exhibit C-34: New T-Mobile Model Assumptions.

[41] Public Advocates Office Testimony on Fifth Generation Wireless Service, Chapter II at p. 13.

American mobile customers will use approximately 48 GB of data per month by 2023.[42] As a result of unreasonably inflated customer data use projections and overestimated customer adoption rates, the model does not realistically reflect traffic load conditions for 2021 or 2024 and underestimates the performance of Sprint and T-Mobile's stand-alone networks.

In its petition to deny filed with the FCC, DISH Network highlighted that the Applicants artificially constrained the capacity of its network models to inflate the impact of the merger on the ability of the two companies to deploy 5G services.[43] The network model the Applicants provided also has this limitation. For the majority of T-Mobile's cell sites, the model allocated between **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** where in its spectrum allocation plan stand-alone T-Mobile will dedicate **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**.[44] While this more reserved allocation of **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** of spectrum to 5G service in the network model may be appropriate to meet the industry's projected 50 percent adoption rate for 5G service by 2025, the Applicants' network model does not allocate enough spectrum resources to handle its aggressive assumptions of customer adoption rates and data consumption. The network model overestimated customer 5G adoption rates, data consumption, and customer addition rates and under allocated Sprint and T-Mobile's spectrum resources. As such, the network model does not give an accurate prediction of the stand-alone capabilities of Sprint and T-Mobile's 5G networks by 2021 or by 2024.

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[42] Ericsson Mobility Report November 2017: https://www.ericsson.com/en/mobility-report/reports/november-2017/mobile-data-traffic-growth-outlook.

[43] Exhibit C-13: Dish Networks Petition to Deny Slides, Slide 24.

[44] Public Advocates Office Testimony on Fifth Generation Wireless Service Chapter II at p. 15.

Analysis of current data rates delivered by 4G LTE services casts further suspicions over the Applicants' broadband speed projections. It is unlikely that between 2018 and 2021, the average data rate experienced across T-Mobile's service territory will decrease or that 5G services, which are projected to have an average data rate of 100 Mbps, will be below or equal to existing average data speeds for 4G LTE services. The discrepancy in projected future data rates presented in figure 7 and current actual data rates supports the conclusion that the Applicants' projections are based on constrained network traffic models that overestimate customer demand and that the stand-alone companies would be capable of realizing faster speeds than claimed. Further, even considering the possibility of spectrum constraints in the network model the Applicants' projected broadband speeds for both 2021 and 2024 are greater than or equal to the FCC's standard for advanced broadband services of 25 Mbps download, 3 Mbps upload (25/3) and match, or exceed, speeds from existing wireline technologies.[45] The capabilities of 5G service are discussed in more depth in Public Advocates Office testimony of Mr. Cameron Reed on Fifth Generation Wireless Service.[46]

The Applicants do not need to merge to provide customers with access to fast broadband speeds as 5G technologies will enable both Sprint and T-Mobile to achieve fast speeds as stand-alone companies. The harm of reducing competitive pressures in the highly concentrated mobile market do not outweigh the benefits to throughput speeds projected to result from the merger.[47]

4. Sprint Experienced Fewer Service Outages than T-Mobile

Service outages are significant degradations in the ability of a user to establish and maintain communications that result from a failure or degradation in the performance of a communications provider's network.[48] Wireless service outages impact both consumers and first

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[45] Chart 12 of the *Eighth Measure Broadband America Fixed Broadband Report* shows the median download and upload speeds by technology at p. 474 of the Collected Appendices.

[46] Public Advocates Office Testimony on Fifth Generation Wireless Service Chapter II.

[47] Wireless Market Concentration is discussed in the Testimony of Dr. Lee Selwyn.

[48] 47 Code of Federal Regulations ("CFR") §4.5 (a).

responder's ability to communicate during emergency situations. First responders are reliant on wireless communications services to operate effectively and efficiently.[49] This means that service outages represent a significant public safety issue.

A customer without voice service may face situations that negatively affect their safety, such as being unable to contact emergency services for assistance. This makes reviewing the frequency and duration of service outages a critical component of evaluating safety and reliability. The Commission collects information related to outages through General Order (GO) 133-D's Major Service Interruption Reports.[50] Major Service Interruption Reports adopted the format of the FCC's Network Outage Reporting System (NORS) reports. These reports include information on the number of customers affected by an outage, location of an outage, and root cause analysis. Voice service providers that experience an outage lasting 30 minutes or more that also potentially affects either 900,000 user-minutes or a 9-1-1 special facility must submit a NORS outage report.[51] In order to calculate the number of user-minutes affected by an outage, the duration of the outage (in minutes) is multiplied by the number of users that are potentially affected by the outage.[52] The 900,000 user-minute threshold was developed to capture widespread outages that affect 30,000 potential users for 30 minutes or more. T-Mobile and Sprint both submit Major Service Interruption reports to the FCC and to the Commission.

Major Service Interruption reports reveal important details about service outages and the level of service that companies provide customer. Outage reports also provide critical information about the portions of telecommunications network most prone to failure. Figure 8 below summarizes the direct cause of T-Mobile's outages for 2017 and portions of 2018.

[49] The Commission concluded as much in D.16-12-066 at p. 168. Finding of Fact 23.

[50] G.O. 133-D § 4.

[51] FCC's NORS reports have other criteria thresholds that would trigger a report, such as 1350 DS3 Minutes. 47 C.F.R. § 4.5(e) has a description of an outage that affects 911 special facilities.

[52] For example, an outage lasting 300 minutes, or 5 hours, that affects 1,000 users would be 300,000 user minutes. Per FCC standards, an outage affecting 1,000 users would need to last 15 hours to be reportable under NORS threshold of 900,000 user minutes.

Figure 8: T-Mobile's Outages by Direct Cause for 2017 and April – December 6, 2018.[53]

<<BEGIN T-MOBILE CONFIDENTIAL>>

<<END T-MOBILE CONFIDENTIAL>>

T-Mobile had a total of **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** in the reported time period. Of T-Mobile's total service outages, **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** T-Mobile's average outage duration was **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted]

[53] Exhibit C-14: Collected T-Mobile Service Outages.

[redacted] **<<END T-MOBILE CONFIDENTIAL>>**[54]

Sprint also submits outage information to the Commission and provided information regarding the NORS outages it has submitted to the FCC since 2015.[55] Figure 9 below summarizes Sprint's service outages.

Figure 9: Sprint's Service Outages by Direct Cause, 2015 – August 31, 2018

<<BEGIN SPRINT CONFIDENTIAL>>

[redacted]

<<END SPRINT CONFIDENTIAL>>

Sprint experience a total of **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** over the four-year period. Of Sprint's outages, **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted]

[54] Exhibit C-14: Collected T-Mobile Service Outages.
[55] Exhibit C-15: Sprint Response to Cal Advocates Data Request No. 001 Question 1-23.

[redacted] **<<END SPRINT CONFIDENTIAL>>** Sprint's average outage duration was **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**

Sprint had fewer outages than T-Mobile, even when considering four years of Sprint's data as compared to two years of T-Mobile. More importantly, Sprint's most common outage causes were due to **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** as opposed to T-Mobile which most commonly experienced outages caused by **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**.While T-Mobile has more cell sites than Sprint, which could account for some of the increase number of outages, the differences of outages are not proportional to the difference in cell sites. Further, the outages for both companies are concentrated in **<<BEGIN CONFIDENTIAL>>** [redacted] **<<END CONFIDENTIAL>>** where Sprint and T-Mobile have most of their infrastructure. The data shows that Sprint's network, of which New T-Mobile plans to decommission approximately two thirds of existing Sprint cell sites, is more rugged than T-Mobile's, especially when it relates to withstanding outages due to **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**. The back-up battery and generator inventories of each carrier is discussed further in the Public Safety chapter of this testimony. Should the Commission fail to deny the merger, the Commission must ensure all of Sprint's existing portable generators are retained so that California service quality is not harmed.

5. Sprint has Increased Customer Satisfaction and Reduced Customer Complaints Since 2015

Customer satisfaction metrics provide insight into the experience that customers receive by providing a direct measure of how satisfied customers are with their service. As discussed below, these metrics include customer complaints and customer satisfaction surveys. Customer complaints provide additional information about service issues that customers face and the level

of customer satisfaction with service. Both customer satisfaction and customer complaints relate to how customers perceive their service quality.

The Commission's Consumer Affairs Branch (CAB) gathers information on informal complains that customers make against utilities and publishes it in monthly reports. These informal complaints typically cover billing, company policy, service quality, and lifeline issues. These complaints offer important insights into the service quality customers are receiving for their carrier and what issues are important to consumers. Table 2 and Figure 10 below summarize customer's informal complaints against Sprint and T-Mobile from 2015 to 2017.[56]

Table 2: Informal Customer Complaints from 2015 to 2017[57]

Company/Year	Billing Complaints	Service Quality Complaints	Policy Complaints	Total complaints
Sprint 2015	97	21	26	144
T-Mobile 2015	86	21	17	124
Sprint 2016	87	16	24	127
T-Mobile 2016	94	17	4	115
Sprint 2017	79	28	14	121
T-Mobile 2017	106	10	10	126
Sprint (All 3 years)	263	65	64	392
T-Mobile (All 3 years)	286	48	31	365

[56] These numbers are gathered from CAB's reports. These numbers do not include informal complaints against MetroPCS or Virgin Mobile. http://www.cpuc.ca.gov/ccd_stats/.

[57] As T-Mobile did not provide Lifeline services from 2015 to 2017, Lifeline related complaints are neither included in Table 2 nor in Figure 10.

Figure 10: Chart of Informal Customer Complaints (2015 – 2017)

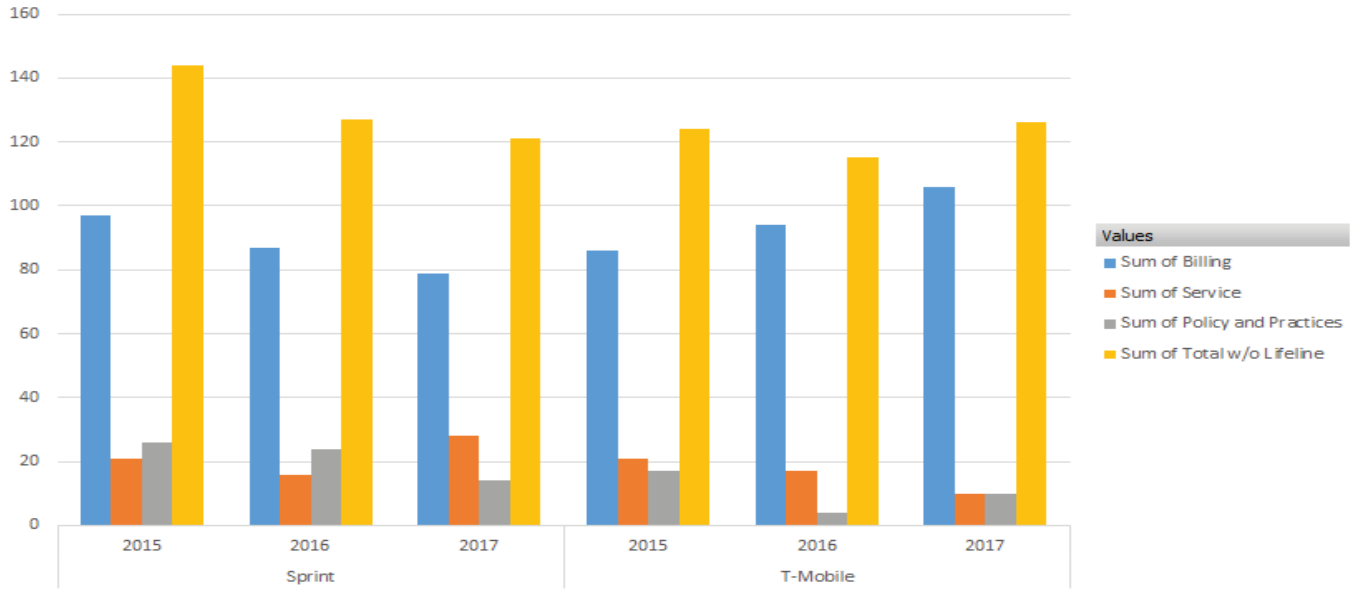


Table 2 and Figure 10 demonstrate that Sprint and T-Mobile have experienced similar total rates of informal customer complaints. Sprint's customers complained twice as often about company polices than T-Mobile's customers. The most apparent trend from Table 2 and Figure 10 are that customers overwhelmingly complain about billing issues. Of the three years examined, customers complained most often of high bills, bill adjustments, or other charges.[58] CAB's informal complaint data illustrates that Sprint and T-Mobile's customers are often concerned with the cost of their service and most often complain about billing issues.

Sprint also maintains a centralized process and database with information concerning issues their customers have.[59] T-Mobile does not have a similar centralized database.[60] Sprint's Executive and Regulatory Services (ERS) handle high-level escalation cases for customers. In a supplemental response to a data request, Sprint provided a summary of complaints it received from 2013 to September 2018. For purposes of comparison, Figure 11 summarizes Sprint's customer's issues from 2015 through September 2018.

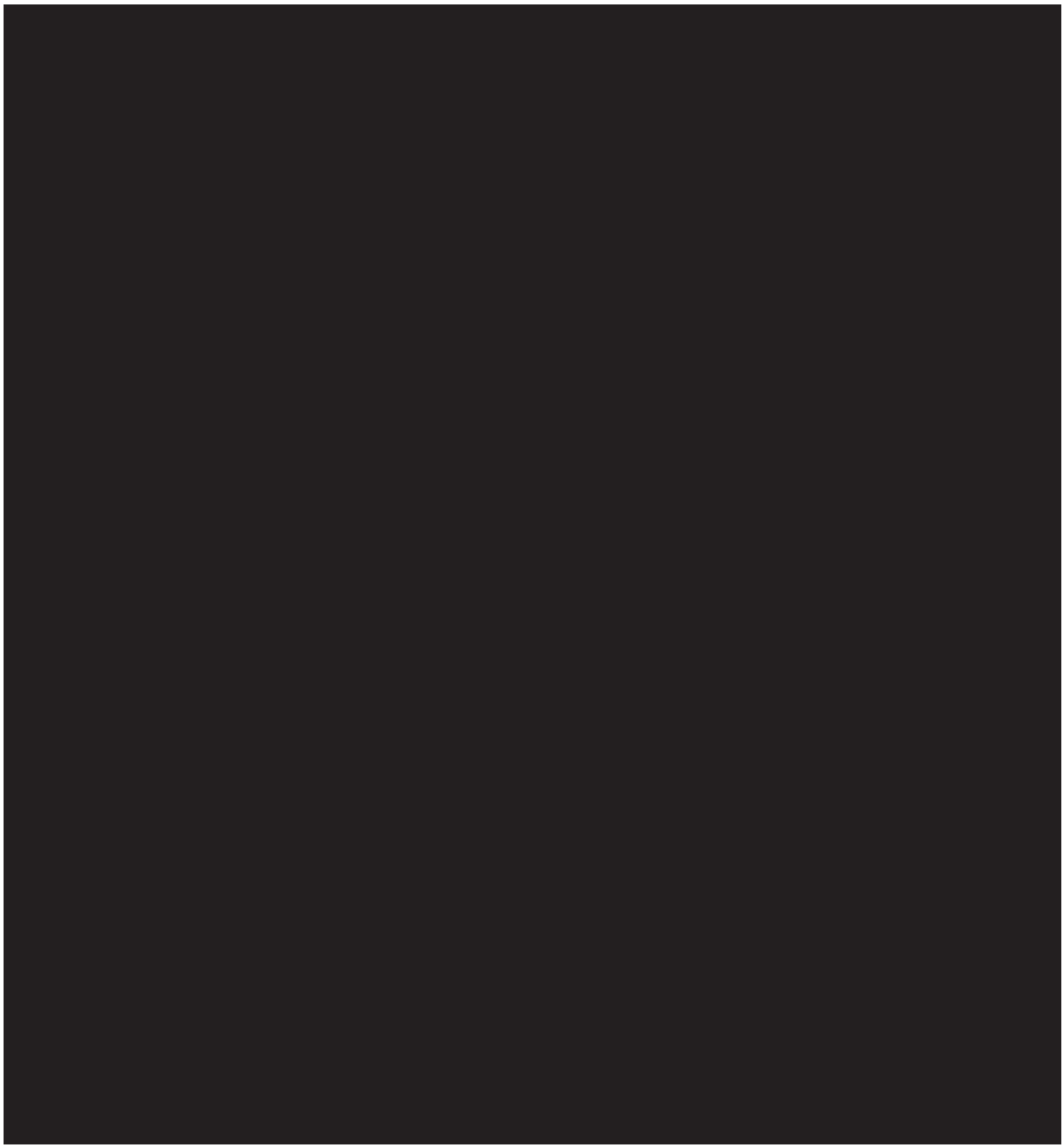
[58] Exhibit C-16: Consolidated CAB informal complaint reports, 2015-2017.

[59] Exhibit C-17: Sprint Response to Cal Advocates Data Request No. 001, Question 1-53.

[60] Exhibit C-18: T-Mobile Response to Cal Advocates Data Request No. 001, Question 1-53.

Figure 11: Sprint's Internal Customer Issues, 2015 through September 2018[61]

<<BEGIN SPRINT CONFIDENTIAL>>



<<END SPRINT CONFIDENTIAL>>

Sprint categorized the issues in Figure 11 as either "customer impacting" or "non-customer impacting" based on the outage type that would occur if the issue is not resolved, e.g.

[61] Exhibit C-19: Sprint Customer Complaints (Confidential).

customer impacting issues would lead to customer outages. Sprint also characterizes issues by severity from **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** Figure 11 shows that since 2015 **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**

While T-Mobile does not have a central repository of data, it was able to provide information from is Executive Response Team on total number of customer complaints.[62] Table 3 below summarizes T-Mobile's customer complaints:

Table 3: T-Mobile's Customer Complaints 2013 through August 31, 2018

<<BEGIN T-MOBILE CONFIDENTIAL>>

Year	2013	2014	2015	2016	2017	2018 (thru 8/31)
Total Complaints	[redacted]					

<<END T-MOBILE CONFIDENTIAL>>

Table 3 demonstrates that T-Mobile's customer complaints are also generally **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**. As Sprint and T-Mobile track customer complaints differently in their systems, it is difficult to directly compare the instances of customer complaints. But the general trends of each data set can illustrate how customer satisfaction is improving or decreasing among the carriers and Sprint has demonstrated a **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** in customer complaints from 2015 to 2018 where, over a similar time frame, T-Mobile has experienced an **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** in customer complaints.

[62] Exhibit C-20: T-Mobile Response to Cal Advocates Data Request No. 001 Question 1-68.

Customer surveys can provide proactive measures of customer's satisfaction with a carrier's service. In response to a data request, Sprint has provided information on customer surveys from 2015 to 2018.[63] This data is compiled by **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** Table 4 below summarizes the responses of Sprint's Customer Survey.

Table 4: Sprint's Customer Satisfaction

<<BEGIN SPRINT CONFIDENTIAL>>

<<END SPRINT CONFIDENTIAL>>

[63] Exhibit C-21: Sprint Response to Cal Advocates Data Request No. 001 Question 1-73.

Sprint's data reveals that **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>**. Generally, customer complaint and customer satisfaction data has shown that Sprint's public perception and service quality has improved over recent years.

C. Conclusion

The above data shows that Sprint's network quality, customer satisfaction, and coverage are increasing in quality. Sprint recently signed a 4-year LTE roaming agreement with T-Mobile. Sprint's throughput speeds have improved and Sprint's CDR and CSSR have decreased and Sprint will be upgrading its network and user equipment to use VoLTE technology. Sprint's performance and perception as a carrier have improved since 2015. Sprint is a viable competitive carrier. While T-Mobile has better service quality by most metrics, it does not retain centralized information regarding its customer satisfaction or complaints.

As Sprint is generally improving its service quality, it is not in a dire position of failure. The Commission should deny the proposed merger as is not needed to improve the service quality of the Applicants. Customers that value service quality over Sprint's prices have the option of switching carriers to T-Mobile, AT&T, or Verizon. The merger will reduce consumer choice at the expense of the most cost-conscious customers if approved and CAB complaint data shows that consumers are overwhelmingly concerned with their bills. Additionally, Sprint and T-Mobile can deploy 5G wireless networks as stand-alone companies that have significantly improved throughput speeds which are faster than the FCC's 25/3 broadband speed standard and comparable to existing wireline services. Furthermore, as Sprint's cell sites are generally less prone to service outages, the merger could potentially be detrimental to service reliability because two thirds of Sprint's cell sites will be decommissioned.

If the Commission fails to deny the merger, the Commission should require that T-Mobile retain Sprint's customer complaint database, portable generator inventory, and back-up battery policy to maintain the quality of the wireless market. Further, the Commission should keep an eye on the level of service quality of the wireless market and require New T-Mobile to report on service quality metrics biannually as discussed in Attachment D to this testimony to monitor service quality post-merger.

III. 9-1-1 SERVICES

Most Californians use their cellphones to access 9-1-1 services, with 80 percent of 9-1-1 calls originating on wireless devices.[64] As such, this merger will have a significant impact on the ability of California customers to contact emergency services. While neither of the Applicants provide transport services directly to Public Safety Answering Points (PSAPs), the Applicants do provision wireless Phase I and Phase II location information and text-to-911 service for PSAPs.[65] Furthermore, wireless calls made by T-Mobile and Sprint's customers rely on the carrier's networks to connect calls to PSAPs.

Wireless 9-1-1 call flow begins with a wireless customer placing a call from their device. The nearby cell tower then routes it to a mobile switching center (MSC). The MSC then checks with a Mobile Positioning Center (MPC) which provides pseudo automatic number identification (pANI). The MSC will then deliver the pANI to a selective router so the call can be connected to an appropriate PSAP.[66] The current 9-1-1 system is unable to push a cellphone's GPS location information to the PSAP and must rely on Phase I and Phase II location information, which is provided by cellular carriers. Phase I information includes the originating telephone number of the call and the wireless tower or station that is transmitting the call. Phase II information requires that carriers provide the latitude and longitude of a caller's location to a PSAP, accurate to anywhere within 50 to 300 meters.[67] However, Phase II information has issues dealing with verticality and cannot easily differentiate when a call is being placed on a multi-floor building. When a PSAP requests Phase I and Phase II service, it must be established within 6 months of such request. Most calls are required to provide accurate information to within 50 to 150 meters within 30 seconds of the call being initiated.[68]

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[64] *See* National Emergency Number Association Statistics on Call Volume at: https://www.nena.org/page/911Statistics.

[65] Exhibit C-22: Sprint and T-Mobile Response to Cal Advocates Data Request Question 1-22.

[66] Exhibit C-23: Intrado Slide Deck to the FCC.

[67] FCC Wireless E911 Rules: 47 Code of Federal Regulations (C.F.R) §20.18.

[68] 47 CFR §20.18(h)(3) *Latency.*

Sprint and T-Mobile state that they generally comply with FCC rules.[69] The National Emergency Number Association (NENA) submitted a letter to the FCC regarding the proposed merger outlining the efforts T-Mobile has undertaken to improve 9-1-1 services for its customers.[70] Some of the claimed strides include acting as an industry leader in the implementation of Next Generation 9-1-1 services and resilience 9-1-1 network design. The Commission should carefully consider what impact New T-Mobile's increased scale and market power will have on its drive to innovate in the field of emergency services.[71] If the Commission fails to deny the merger, the Commission should improve the condition of the mobile market by directing New T-Mobile to work with the California Office of Emergency Services to implement wireless Next Generation 9-1-1 services across is service territory.

[69] Exhibit C-22: Sprint and T-Mobile Responses to Cal Advocates Data Request Question 1-22.

[70] Exhibit C-24: NENA letter to the FCC.

[71] New T-Mobile's increased market power is discussed in the Public Advocates Office testimony of Dr. Selwyn.

IV. EMERGENCY PREPAREDNESS AND PUBLIC SAFETY

A. Introduction

Emergency situations are demanding and stressful events that require careful pre-planning in order to properly respond to. First responders and the public both rely on wireless networks to communicate and this need is especially pronounced during an emergency. As wildfires grow more intense and common in California,[72] the Commission should ensure that the merger doesn't reduce the combined company's ability to respond and provide support during emergencies. This review includes ensuring emergency plans are thorough with defined responsibilities, that the Applicants retain a robust inventory of deployable equipment such as portable generators and cell on wheels (CoWs), and that first responders have access to plans and support they need without throttling or data limits during emergencies.

B. T-Mobile's Plan to Decommission Sprint's Equipment and Infrastructure will Harm Public Safety.

1. Sprint and T-Mobile Have Robust Emergency Response Plans

The first element of emergency preparedness is having a set emergency response plan. An emergency plan should help assure the company is best able to protect life and property during an emergency and contain the information needed to ensure continuity of operations and services.[73] A company needs to review the information within an emergency plan to ensure the plan remains relevant and useful. An emergency plan outlines a written methodology for responding to emergencies and contains pages to store important contact information for internal and external resources. Sprint and T-Mobile both have robust emergency plans based on guidelines that the Cellular Telecommunications Industry Association (CTIA) uses for yearly certification and yearly emergency drills.[74]

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[72] Governor Jerry Brown called the wildfire situation in California the "new normal" last summer. https://www.cnbc.com/2018/08/01/brown-warns-new-normal-of-california-fires-could-bring-fiscal-stress.html.

[73] CPUC GO-166: Purpose http://www.cpuc.ca.gov/gos/GO166/GO166_startup_page.html.

[74] Exhibit C-25: T-Mobile Responses to Cal Advocates Data Request 4 Question 4-7.

2. Sprint's Existing Fleet of Portable Generators, Deployables, and Cell Site Battery Back-ups Provide Critical Public Safety Benefits That the Merger May Harm

Emergency equipment is a critical aspect of how companies respond to emergencies. Portable generators, CoWs, Cell on Light Trucks (CoLTs), and fixed generators are important inventory assets that assist in emergency response. Generators supply power to cell towers or switches when power is otherwise unavailable and portable cellular infrastructure such as CoWs and CoLTs supplement coverage when existing infrastructure is damaged.

Sprint has a general policy that it designs network sites with battery backups that provide 4-8 hours of emergency power in the event of commercial power outages.[75] Sprint also maintains a significant fleet of portable generators, with 1,800 nationwide portable generators available within 2-4 hours of 90 percent of its cell sites. **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** of these portable generators are in California and an additional **<<BEGIN SPRINT CONFIDENTIAL>>** [redacted] **<<END SPRINT CONFIDENTIAL>>** are in states close to California.[76] Sprint also has fixed generators location at key cell sites and switch facilities which can provide power for between 2 to 5 days. Sprint also maintains a fleet of CoWs and states it is proactive in removing data caps during an emergency.[77] T-Mobile likewise also generally maintains **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**.[78],[79] T-Mobile has **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>** portable generators in California and can mobilize an additional **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted]

[75] Exhibit C-26: Sprint Response to Cal Advocates Data Request 1 Question 1-45.

[76] Exhibit C-27: Sprint Response to Cal Advocates Data Request 1 Question 1-47.

[77] Exhibit C-28: Sprint Response to Cal Advocates Data Request 2 Question 2-28.

[78] Exhibit C-29: T-Mobile Response to Cal Advocates Data Request 6 Question 6-8.

[79] Exhibit C-30: T-Mobile Response to Cal Advocates Data Request 6 Question 6-9 and 6-10

<<END T-MOBILE CONFIDENTIAL>> to California within 48 hours. As demonstrated by the service outage information analyzed in Chapter II, T-Mobile's network experiences more outages from **<<BEGIN T-MOBILE CONFIDENTIAL>>** [redacted] **<<END T-MOBILE CONFIDENTIAL>>**. Sprint's generator fleet is a likely contributor to this difference, and if the Commission fails to deny the merger it must ensure that Sprint's inventory of portable generators, CoWs, and CoLTs are maintained so that public safety is not put at risk by decreased emergency readiness.

3. The Proposed Merger Will Reduce Cellular Infrastructure Redundancy in California and Harm Public Safety

Emergency responders and public safety personnel are dependent on having access to telecommunications services to do their jobs safely and effectively. Cal Fire's Situation Awareness and Collaboration Tool[80] (SCOUT) improves communications during emergency situations so long as emergency personnel have access to a telecommunications network. Cal Fire incident camps often need a phone line to each trailer to help logistics and coordination efforts. Communication is vital to the protection of emergency responders, and quick service restoral of network connections is critical in, or following, emergency situations.

Sprint and T-Mobile both have public safety customers in California and both respond to Request for Proposals by public safety and governmental customers.[81] In addition to the importance of deployables as discussed above, first responders need access to a reliable and redundant network that can support their operations. Sprint and T-Mobile as competitors and stand-alone companies have cellular infrastructure that first responders can rely on for redundant and diverse service from multiple carriers. As a combined company, the Applicants plan to retain approximately 11,000 of Sprint's national cell sites.[82] Sprint's remaining cellular sites will be decommissioned, reducing the amount of redundant cellular infrastructure in California. This will reduce the availability of geographically diverse cell towers and cellular switching

[80] SCOUT is a web-based command and control environment that allows emergency responders to share maps and information with each other quickly and on a single, unified platform. More information on SCOUT can be found at the following address: https://www.scout.ca.gov/scouthelp/articles/about.php last visited December 7, 2018.

[81] Exhibit C-31: Sprint and T-Mobile Responses to Cal Advocates Data Request 2 Question 2-26.

[82] Exhibit C-32: T-Mobile Response to Cal Advocates Data Request 1 Question 1-30.

infrastructure, making it more difficult for first responders to attain diverse and redundant cellular service. If it fails to deny the merger, the Commission should direct New T-Mobile to construct a dedicated public safety network to improve the wireless markets for first responders to provide redundant infrastructure to the First Responder Network Authority and Verizon's competitor service.[83]

C. Conclusion

By removing one company from the market, the merger would diminish the ability of first responders to attain geographically diverse services carried on separate infrastructure, as only three companies would be offering facilities based wireless service. This lack of choice will harm first responders not just by potentially decreased competition, but on decreased options for redundant communications networks. The Commission should be very mindful of the effect that decreasing the presence of cellular infrastructure, which is vital to emergency response efforts, could have on California's resiliency to disasters such as wildfires and earthquakes. If the Commission fails to deny the merger, then it should improve the wireless market in California by requiring that New T-Mobile construct a dedicated first responder network, like AT&T's FirstNet or Verizon's competitor service, to mitigate the harms of reduced infrastructure.

[83] http://www.govtech.com/public-safety/FirstNet-Verizon-Launch-Dedicated-Public-Safety-Networks.html

V. CONCLUSION

Sprint has been improving its service quality year over year since 2015 and is improving its public image. T-Mobile's service quality and speed test data show that it is offering faster speeds than Verizon and AT&T. Further, the merger will reduce the amount of redundant cellular infrastructure in California and negatively impact public safety and the resiliency of cell sites in California.

In summary, the potential benefits of the proposed merger do not outweigh the harms of eliminating a facilities-based carrier with a robust network, and it is not in the public interest. The Commission should deny the proposed merger.

ATTACHMENTS

ATTACHMENT A

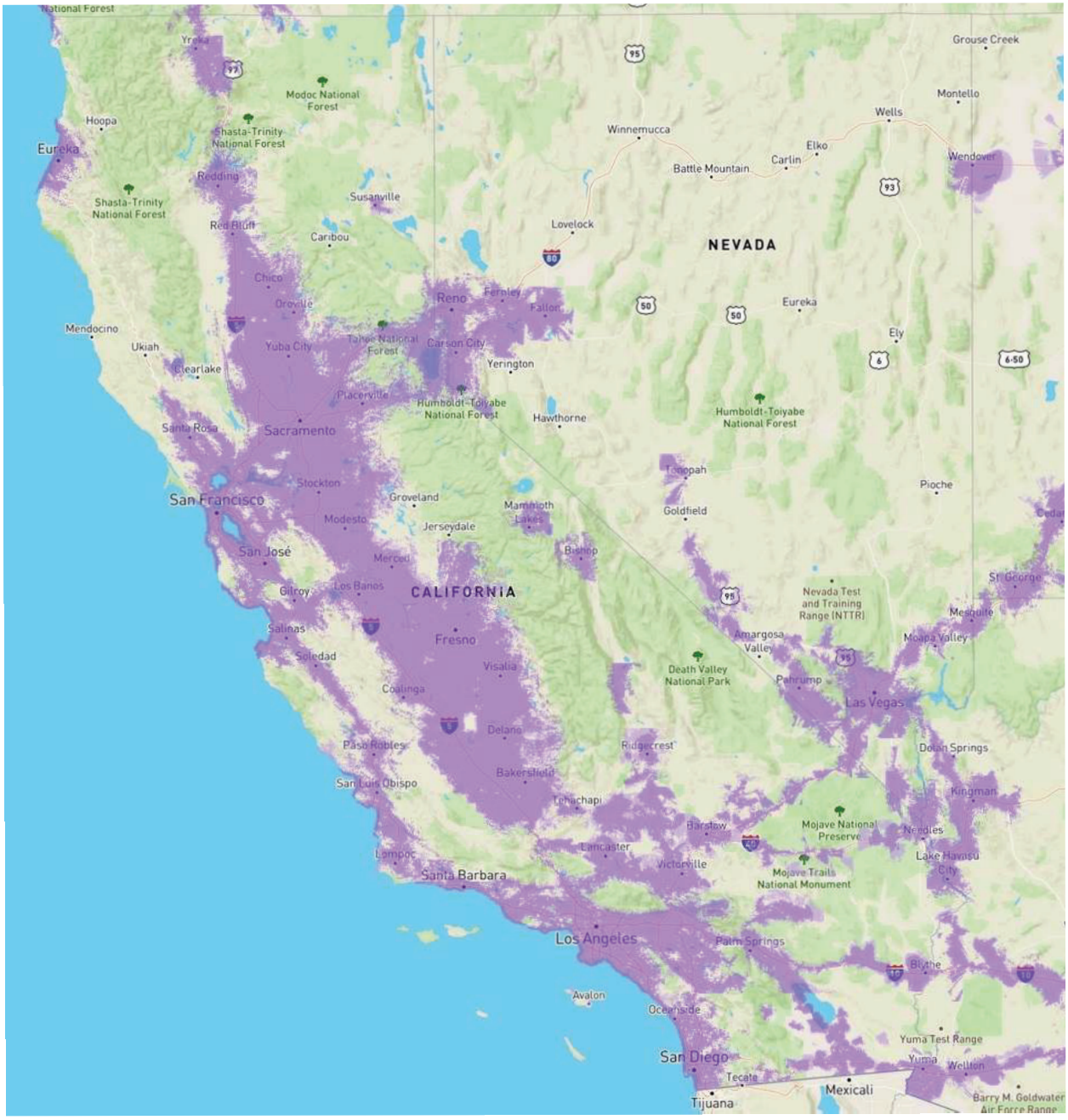
Statement of Qualifications and Experience

My name is Cameron Reed. I am currently employed by the California Public Utilities Commission (Commission) as a Utilities Engineer assigned to the Public Advocates Office Communications and Water Policy Branch. I have a Bachelor of Science in Mechanical Engineering from the University of California-Davis. My studies included courses in engineering control systems, electrical circuits, experimental methodology, and mechanical systems design. I am a member of the Phi Theta Kappa honor society.

I began work with the Commission on July 5, 2016. I have worked on evaluating California Advanced Services Fund (CASF) Infrastructure and Public Broadband Housing applications. The CASF program funds broadband deployment projects in unserved or underserved areas of California and involves, among other items, evaluating utility financial information, deployment plans, and any existing broadband infrastructure in the area. I have previously submitted testimony concerning Telecommunications Public Safety in the general rate case (GRC) of Sierra Telephone Company (Application 16-10-003), Service Quality and Public Safety in the GRC of Ducor Telephone Company, (Application 17-10-003), Service Quality in the GRC of Foresthill Telephone Company (Application 17-10-004), and Public Safety and Cybersecurity in the Application of Pacific Gas and Electric for a Certificate of Public Convenience and Necessity to become a Competitive Local Exchange Carrier (Application 17-04-010). I reviewed the merger between CenturyLink and Level 3 Communications (Application 17-03-016). I have reviewed thousands of the Federal Communications Commission's Network Outage Reporting System outage reports. During my time at the Commission, I have completed the National Exchange Carrier Association's (NECA) Foundations of Telecommunications Curriculum and completed the 38th Western National Association of Regulatory Utility Commissioners (NARUC) Utility Rate School.

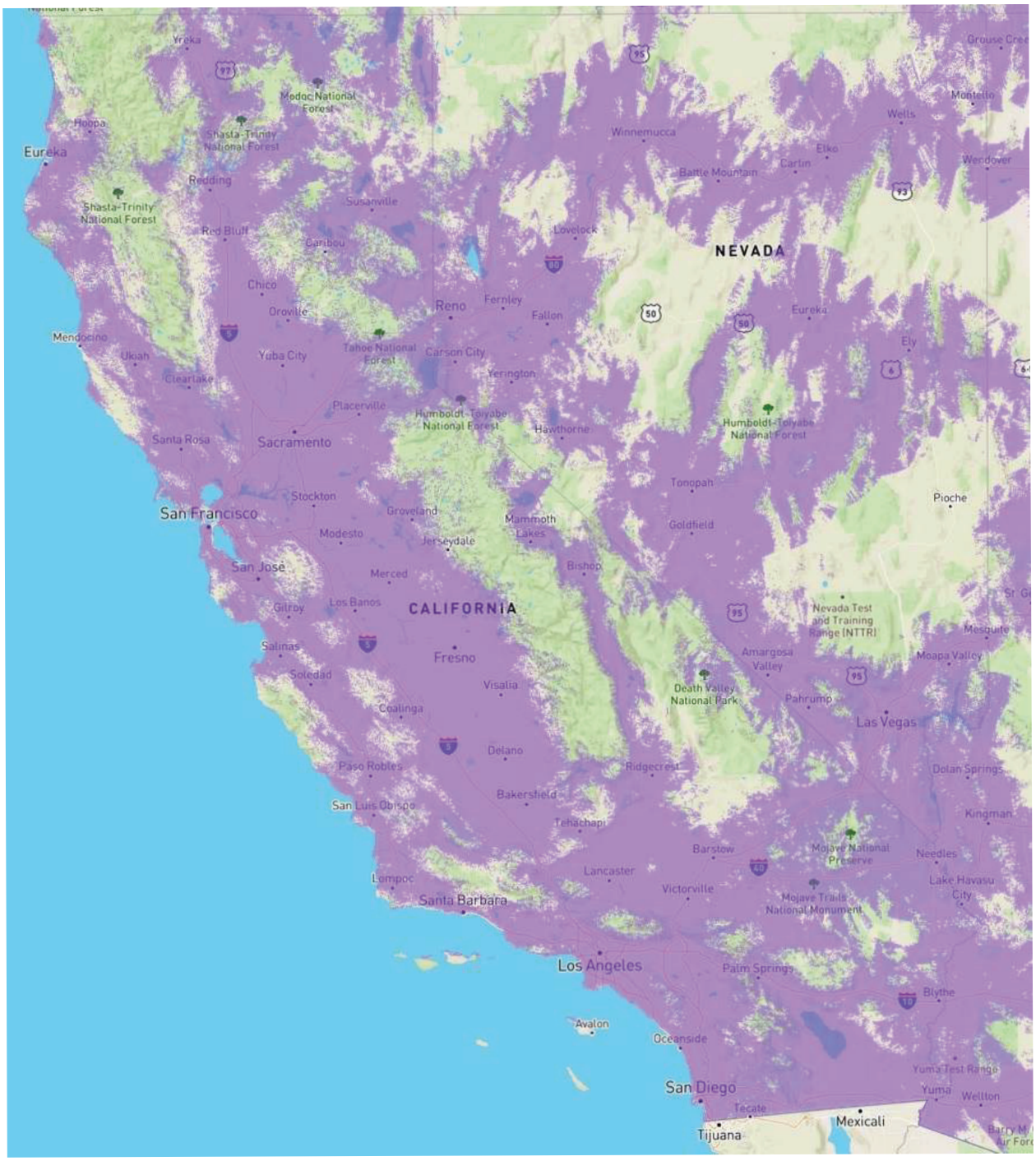
ATTACHMENT B

WhistleOut's California Coverage Map for Sprint



ATTACHMENT C

WhistleOut's California Coverage Map for T-Mobile



ATTACHMENT D

New T-Mobile Service Quality Report:

If the Commission fails to deny the merger, then New T-Mobile should report the following service quality data to the Commission and to the Public Advocates Office on a bi-annual basis.

For a given year, New T-Mobile should file these reports on September 1, for information on performance in Quarter 1 and Quarter 2, and on March 1 of the next year for information on performance in Quarter 3 and Quarter 4.

a. Biannual network availability for voice and data services in California. The percent of New T-Mobile's network availability for wireless services, for its entire network. Network availability may also be reported for each zip code, geographical market, and/or census block, if that information is available.

b. Biannual aggregated data on service outages in California. For each service outage, the data should include:

i. Number of customers affected
ii. Type of customers affected: residential, small business, or large business
iii. Incident Date
iv. Incident Time
v. Duration of outage in total minutes
vi. Outage restoration time
vii. Location of outage: County, City and Census Block(s)
viii. Equipment failed
ix. Network involved
x. Description of the Cause
xi. Description of the Root cause
xii. Description of the incident
xiii. Methods used to restore the outage
xiv. Steps taken to prevent the outage from re-occurring

c. Biannual broadband average and peak network speeds experienced by a cell sector and by a user in Megabits per second (Mbps) for California for 4G LTE and 5G services. The data would include information on:

i. Average download speeds that users experience
ii. Average upload speeds that users experience
iii. Average download speeds of a cell site/cell sector
iv. Average upload speeds of a cell site/cell sector
v. Peak download speeds that users experience
vi. Peak download speeds of a cell site/cell sector

d. Biannual data on average Latency on New T-Mobile's network in California. The Latency, in milliseconds, of New T-Mobile's network availability for wireless services, for its entire network. Latency may also be reported for each zip code, geographical market, and/or census block, if that information is available.

e. Biannual 5G network coverage maps showing areas in California where 5G service is available and where customers can get adequate signal strength to receive data.

f. Customer-initiated complaints regarding New T-Mobile's wireless voice and broadband service in California. This data should include:

i. Type of complaint: billing (identify type of billing complaints, such as unauthorized charges, disconnection, high bill), lifeline issues, delayed orders/missed appointments, customer service, refusal to provide service, availability/service outages, equipment, interference, privacy, data speeds.
ii. Type of customer: residential, small or large sized business.
iii. Date of complaint
iv. Resolution time for a complaint
v. Customer Location: County, City and Census Block
vi. Frequency of complaint by the same customer