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**OPENING COMMENTS OF THE PUBLIC ADVOCATES OFFICE
ON THE ORDER INSTITUTING RULEMAKING PROCEEDING
TO CONSIDER AMENDMENTS TO GENERAL ORDER 133**

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I. INTRODUCTION

Pursuant to Rule 6.2 of the California Public Utilities Commission's (Commission) Rules of Practice and Procedure and Order Instituting Rulemaking Proceeding to Consider Amendments to General Order 133 (OIR), the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) submits these opening comments in response to the questions in Section 3 of the OIR.

Broadband and voice services such as wireless and interconnected Voice over Internet Protocol (VoIP) are essential communications services necessary to participate in today's economy and society. Data shows that the public increasingly rely on broadband and wireless services as their main communications method to reach emergency services participate in the economy, learn of current events, and communicate with each other,¹ Applying for jobs, paying taxes, finding shelter, navigating transportation, communicating with health care providers, and obtaining critical information about health and safety emergencies are all now done using broadband and wireless services. It is a matter of public health and safety to establish minimum service quality standards for today's essential communications services to protect customers in times of emergency when they need these services the most.² Individuals who pay for these communications services expect that they work in moments of greatest need. By opening this Rulemaking, the Commission has acknowledged the importance of service quality for the safety of customers in California.

In addition to adopting new service quality standards for broadband, wireless, and interconnected VoIP service, the Commission should expand the existing General Order 133-D (GO 133-D) service quality metrics to broadband and interconnected VoIP

¹ Federal Communications Commission (FCC)'s reports on Internet Access Service found here: <https://www.fcc.gov/internet-access-services-reports> and Voice Telephone Service Reports found here: <https://www.fcc.gov/voice-telephone-services-report> (Reports Released March 9, 2022). California has almost 3 times the number of Broadband subscribers compared to circuit switched landline telephone subscribers.

² There are many recent examples of the need for entities to communicate to the public during emergencies including; wildfires, Public Safety Power Shutoffs, and active shooter notifications.

service, and expand the Customer Trouble Report standard and the Answer Time standard to wireless service.³ The Commission should also update the Customer Trouble Report standard to reduce the target number of Trouble Reports and the Answer Time standard and to increase the number of communications service providers subject to the standard by removing the 10,000 access line requirement. The Commission should update its enforcement mechanisms to hold communications service providers accountable for keeping people connected and providing reliable service. The Commission should adopt new network service quality metrics for wireless service measuring cell site outages and wireless voice quality.

Finally, the Commission should consider customer service quality metrics to wireline broadband service, service quality metrics for network technical quality, and explore appropriate benchmarks to measure wireless network technical quality by examining what metrics wireless service providers track to determine the performance of wireless networks. These updates and additions to GO 133-D will help California customers get the baseline level of service they expect, pay for, and deserve from communications service providers.

II. Discussion

A. The Commission Should Apply the Existing Service Quality Standards to Wireless and Interconnected VoIP Services as well as to Broadband Services.

The OIR asks if there are any existing service quality metrics that should be extended to wireless and interconnected VoIP services.⁴ The Commission should apply the existing service quality standards to wireless and interconnected VoIP services as outlined in Table 1 below. As the OIR notes, the *Examination of the Local Telecommunications Networks and Related Policies and Practices of AT&T California and Frontier California* (Network Exam) Phase 2 report recommends that GO 133-D

³ Interconnected VoIP service and Wireless Carriers are defined in GO 133-D. The Commission needs to add a new definition to GO 133-D that defines broadband service and broadband service providers.

⁴ OIR, p. 16.

apply to all wireline voice services regardless of the underlying technology.⁵ The Commission should go further and extend Answer Time and Customer Trouble Reporting customer service standards to wireless service providers. As explained in Figure 1 and 3 below, customers are largely dissatisfied with the service quality of communications service providers' call centers. Customers of all services deserve timely resolution of their issues and timely installation of their services. Table 1 summarizes existing GO 133-D standards that should apply to Plain Old Telephone Service (POTS), interconnected VoIP, and wireless service.

Table 1: GO 133-D Standards and Recommended Applicable Services

Standard	Recommended Applicable Services⁶
3.1 Installation Interval	POTS, Interconnected VoIP, and Broadband Services ⁷
3.2 Installation Commitment	POTS, Interconnected VoIP, and Broadband Services
3.3 Customer Trouble Reports	POTS, Interconnected VoIP, Wireless, and Broadband Services
3.4 Out of Service Repair Interval	POTS, Interconnected VoIP, and Broadband Services
3.5 Answer Time	POTS, Interconnected VoIP, Wireless, and Broadband Services

B. The Commission Should Modify the Customer Trouble Report and Answer Time Standards.

The OIR asks whether the Commission should modify any existing service quality standards.⁸ As discussed in more detail below, the Commission should reduce the rate of

⁵ OIR, p. 8.

⁶ As wireless service does not involve customer premise equipment, and customers can bring their own phones to a wireless service provider, the existing service quality metrics of Installation Interval, Installation Commitment, and Out of Service Repair interval need not apply to wireless service providers.

⁷ Extending these existing standards to broadband service should be addressed in Phase 2 of this proceeding.

⁸ OIR, Section 3.1 Question 2, pp. 16-17.

maximum allowable Customer Trouble Reports and expand the number of companies that are required to comply with the Answer Time standard.

1. The Customer Trouble Report Standard Should Be 3 Reports per 100 Lines and Be Measured for Each Wire Center.

The Customer Trouble Reports standard currently measures dissatisfaction from POTS customers relating to service affecting, and out of service, trouble reports.² The GO 133-D Customer Trouble Report Standard varies based on wire center size. Wire centers with 3,000 or more working lines must meet a 6% standard, wire centers with between 1,000 and 3,000 working lines must meet an 8% standard, and those 1,000 or fewer working lines must meet a 10% standard.¹⁰ The standard for smaller wire centers is more lenient, and the result is that one in ten customers can have issues with their service before small wire centers are out of compliance with the Customer Trouble Report Standard. One in ten customers having an issue with service is too high an allowance. In addition to expanding the Customer Trouble Reports as outlined in Table 1, the Commission should also decrease the threshold for not meeting the Customer Trouble Report standard.

The Network Exam recommended in both the Phase I and Phase II reports that the Commission reduce the Customer Trouble Report standard rates because the 6%, 8%, and 10% trouble rates based on wire center size are too high.¹¹ The Phase 2 Network Exam further recommends that GO 133-D standards apply uniformly to each individual wire center.¹² The Commission should apply both of these recommendations by reducing the Customer Trouble Report standard by half to 3% and applying the percentage uniformly

² General Order 133-D Section 3.3 (a).

¹⁰ General Order 133-D Section 3.3 (c).

¹¹ Phase 2 Network Examination, recommendation 5, p. 9.

¹² Phase 2 Network Examination, recommendation 7, p. 9.

to all wire centers or wire center equivalent (such as a headend)¹³ for Interconnected VoIP Providers regardless of the lines served by the wire center.¹⁴

Wireless service providers should report compliance with the standard on a statewide basis because wireless customers use multiple cell towers and can move between switching centers during the normal course of their day. The portable nature of wireless service means that a customer's call expressing dissatisfaction might relate to service from a mobile switching center or a cell tower that does not serve their billing address. This means the geographic information of a customer reporting trouble and the infrastructure which caused that trouble will not always link. As such, the Commission should measure Customer Trouble Reports for wireless service providers on a statewide basis and adopt additional standards, as outlined in table 2 below, to improve wireless service quality.

2. The Commission Should Revise the Answer Time Standard Reporting Threshold to Apply to More Communications Service Providers.

The Answer Time standard measures the average time for an operator or customer service representative to answer customer calls on billing and non-billing inquiries and for trouble reports within 60 seconds.¹⁵ The GO 133-D Answer Time standard does not apply to communications service providers with less than 10,000 lines.¹⁶ The Communication Division (CD)'s report on California Wireline Telephone Service Quality Pursuant to General Order 133-C and 133-D Calendar Years 2014 through 2016, published May 8, 2018 (2018 GO 133 Report), noted that the Answer Time data received for Uniform Regulatory Framework (URF) carriers and General Rate Case (GRC) Incumbent Local Exchange Carriers (ILECs) is incomplete because many carriers did not

¹³ Headends are the control centers in a cable television or cable broadband system where signals and connections are aggregated.

¹⁴ Extending the Customer Trouble Report standard to broadband service should be addressed in Phase 2 of this proceeding.

¹⁵ GO 133-D Section 3.5 (a).

¹⁶ GO 133-D Section 3.5 (d).

report for the entire time period.¹⁷ CD staff ‘s 2018 GO 133 Report recommended reducing the minimum 10,000 line reporting threshold because many communications service providers currently fall below that reporting threshold , so a reduced threshold would require more communications service providers to report their Answer Time data.¹⁸ The Commission should remove the 10,000 line threshold from the requirements of GO 133-D Section 3.5(d) and instead apply the standard to all GRC ILECs and facilities-based communications service providers with 5,000 or more customers statewide.¹⁹

C. The Commission Should Adopt New Metrics for Voice Services.

The OIR asks whether the Commission should develop new service quality standards applicable to wireless and interconnected VoIP services.²⁰ Because many of GO 133-D’s existing service quality standards were designed for wireline service, the Commission should adopt new service quality standards designed to measure and improve the technical quality of wireless networks. Customers are dissatisfied with the call reliability and call center performance of wireless providers.²¹ The American Customer Satisfaction Index (ACSI) is a national cross-industry measure of customer satisfaction, measuring satisfaction with the quality of products and services offered within the US. The ACSI analyzes the telecommunications industry, including Internet Service Providers (ISPs), landline providers, and wireless providers.

As shown in Figure 1, customers gave the wireless industry an average “C” grade based on 2020 and 2021 data. Figure 1 shows that among the various Customer

¹⁷ 2018 GO 133 Report, p. 3.

¹⁸ 2018 GO 133 Report, p. 30.

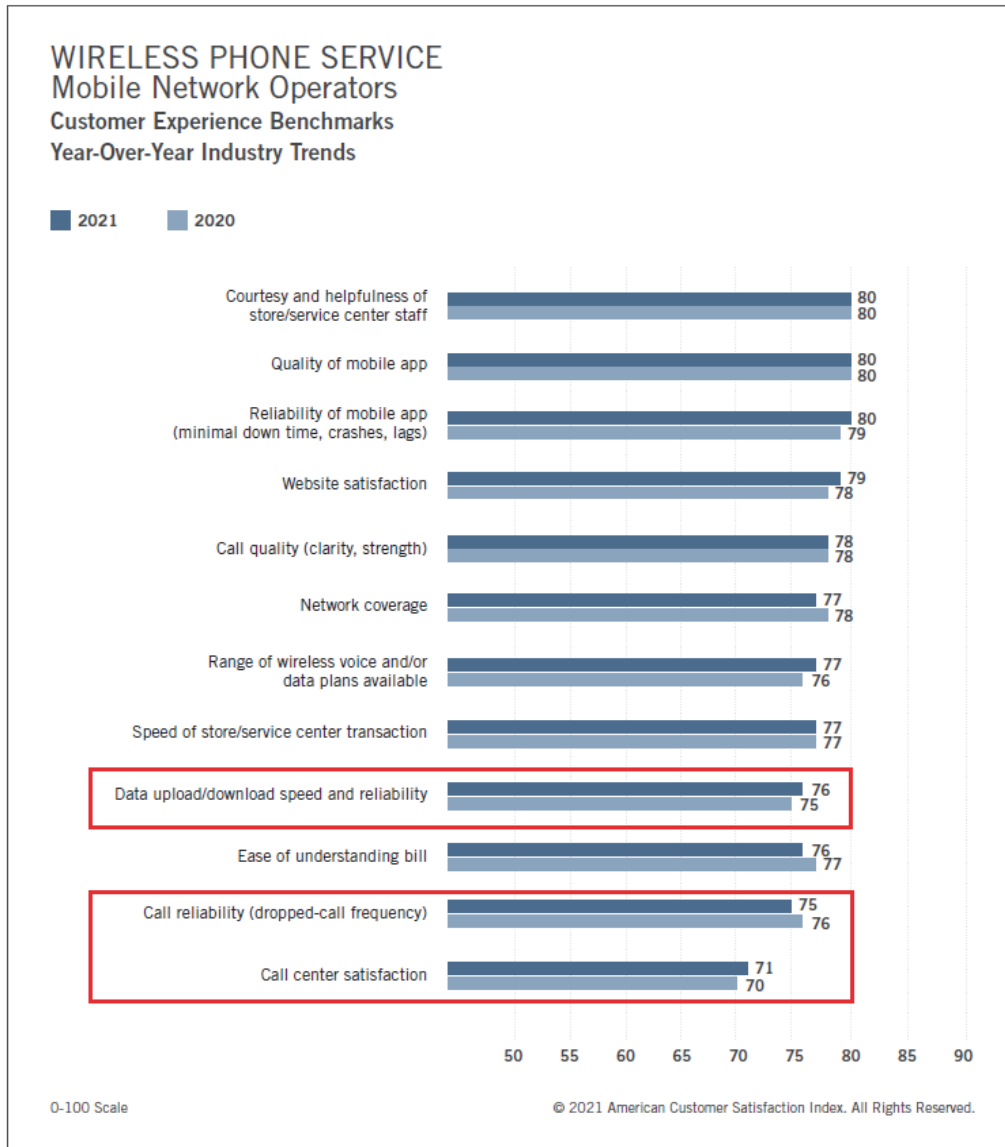
¹⁹ Extending the Answer Time standard to broadband service should be addressed in Phase 2 of this proceeding.

²⁰ OIR, pp. 16-17.

²¹ *Reply of the Public Advocates Office to Parties Responses on the Petition for Rulemaking to Amend General Order 133-D to Modernize Minimum Service Quality Standards*, filed November 15, 2021 in P 21-10-003, p. 14.

Experience Benchmarks (CEBs), customers are more dissatisfied with the quality and reliability of their service.

Figure 1: ACSI CEBs for Wireless Phone Service 2020-2021 (Red Outline Added)²²



Furthermore, wireless subscriptions continue to increase as POTS continues to decline. The Federal Communications Commission (FCC) reported that the number of

²² ACSI Wireless Phone Service and Cell Phone Study, [21jun_acsi-cell-wireless-STUDY.pdf](https://www.theacsi.org/21jun_acsi-cell-wireless-STUDY.pdf) ([theacsi.org](https://www.theacsi.org)).

wireless customers in California increased from 43.83 million in December 2018 to 44.45 million in December 2019 and that the number of POTS customers decreased from 4.75 million in December 2018 to 4.47 million in December 2019.²³ As the FCC’s data shows, the number of wireless subscriptions in California is significantly larger than the number of POTS subscriptions. The Commission should update the existing service quality standards to reflect this reality. The Commission should adopt the Call Failure Rate, Call Drop Rate, Call Setup Time, and Cell Site Outages metrics as summarized in Table 2 below, with additional detail in Attachment A to these comments.

Table 2: Summary of Wireless Network Technical Standards

Wireless Network Technical Standard	Definition
Call Failure Rate	Call Failure Rate is a measure of the number of calls that are unable to initiate due to adverse network conditions such as traffic and congestion. Measured by the number of calls that fail to initiate divided by the total number of calls attempted. Calls that are terminated before initiation due to actions of the customer are not considered failed calls. Lower percentages of call failure rate would be one indicator of higher quality service. Measured by Mobile Switching Center.
Call Drop Rate	Call Drop Rate is a measure of the amount of prematurely terminated calls on a telephone network. A call is dropped when it is ended by the network, not either user. Lower percentages of call drop rates would be one indicator of higher quality service. Measured by Mobile Switching Center.
Call Setup Time	Call Setup Time is the amount of time it takes a network to connect the calling device to the called device and produce a ringing tone. Lower call setup times would be one indicator of higher quality service. Measured by Mobile Switching Center.
Cell Site Outage	An outage that limits a communication’s service provider’s end user’s ability to make calls, receive emergency notifications, or access basic Internet functionality (as defined by Decision 20-07-011) that lasts for at least 30 minutes and affects at least 25% of a communication service providers’ coverage in a single zip code.

²³ FCC Voice Telephone Services Report, state-level subscriptions for California released March 9, 2022 Available at: <https://www.fcc.gov/voice-telephone-services-report> (Last accessed May 6, 2022).

The wireless network technical standards seek to measure the reliability of voice calls. Call Failure Rate and Call Drop Rate, or similar analogs, are used by industry groups²⁴ and service quality testers²⁵ to measure the reliability and quality of mobile phone calls.²⁶ These metrics will serve as a measure of the reliability of mobile voice networks.

Furthermore, because wireless service is delivered by cell towers to multiple customers, and customers do not have customer premises equipment, the Commission needs a metric other than GO 133-D's Out of Service Repair Interval to track small wireless outages. The California Office of Emergency Services (CalOES) regulation on community isolation outages is a good model for devising a metric to track small wireless outages. CalOES defines community isolation outages for mobile phone providers as an outage that lasts for 30 minutes and affects at least 50% of a providers' users in a single zip code.²⁷ On April 1, 2022, CalOES issued a Notice of Proposed Rulemaking to reduce the threshold for community isolations outages to 25%.²⁸ As such, the proposed Cell Site Outage metric, as defined in Table 2 above, matches this proposal.

The Commission adopted the Major Service Interruption framework, which required POTS, interconnected VoIP, and wireless communications service providers to submit a copy of FCC Network Outage Reporting System (NORS) information to the

²⁴ Qualcomm, a company that creates equipment and services related to wireless technology, notes that failed mobile calls often lead to customer complaints and that network operators can improve the mobile experience for customers by reducing failed calls. Last Accessed May 6, 2022 at <https://www.qualcomm.com/media/documents/files/white-paper-understanding-mobile-terminated-call-failures.pdf>

²⁵ Voxco, a software company with produces analytical tools and data collection platforms, notes Call Setup Success Rate (CSSR), the inverse of Call Failure Rate, as a key performance indicator which directly influences and measures customer satisfaction with service and evaluate the performance of networks. Last Accessed May 6, 2022 at: <https://www.voxco.com/call-setup-success-rate/>

²⁶ Rootmetrics Mobile Network Performance in the US: A Special Report (August 2016). Last accessed May 6, 2022 at <https://rootmetrics.com/en-US/content/mobile-network-performance-in-the-us-a-special-report>

²⁷ 19 California Code of Regulation (CCR) § 2480.2 (a)(3).

²⁸ California Governor's Office of Emergency Services Proposed Amendments to Community Isolation Outage Regulations Title 19, Division 2, Chapter 1.5, publish April 1, 2022.

Commission. The Commission can use a similar process here, requiring wireless service providers to send already prepared information regarding more localized cell tower outages to the Commission.

In addition to these network technical quality standards, the Commission should adopt a new customer service standard for wireless, interconnected VoIP, POTS, and broadband service measuring Repeat Trouble Reports.²⁹ This standard would measure whether customers’ issues were adequately addressed by the provider with long-term solutions rather than quick fixes that lead to repeated issues.

Customer Quality Standards	Definition
Repeat Trouble Reports	Repeat Trouble Reports are service affecting and out of service trouble reports submitted by the same customer or user relating to dissatisfaction with communications service provider’s services within 30 days after a previous trouble report was cleared for the same issue. Fewer repeat trouble reports would be one indicator of higher quality service. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.

D. The Commission Should Update General Order 133-D’s Enforcement Framework and Penalty Mechanism.

The OIR asks if GO 133-D’s enforcement framework and penalty mechanism serve the public interest and, if not, how the framework should be modified to do so.³⁰ The current enforcement framework³¹ includes fine calculations and alternative proposals for mandatory corrective action (alternative proposal)³² that are not functioning as an effective deterrent against future violations, thereby harming the public rather than serving the public interest. The Commission should revise the fine tabulations to increase the fines and adjust them to scale and should eliminate the alternative proposal.

²⁹ While broadband is addressed in Phase 2, we encourage network technical quality standards be included as an issue to be considered.

³⁰ OIR, p. 17.

³¹ GO 133-D Section 9.

³² GO 133-D Section 9.7.

Furthermore, the Commission should implement customer credits to compensate customers for substandard service quality. These modifications would allow the enforcement of GO 133-D to be automatic and would serve as a consistent deterrent against violations.

1. The Current Enforcement Framework Does Not Serve the Public Interest.

The current penalty mechanism has proven to be an ineffective deterrent to violations. Utilizing the Commission’s Enforcement Policy and Penalty Assessment Methodology,³³ GO 133-D’s enforcement framework does not further public interest because the penalties have not deterred unlawful conduct for years. The communications service providers have submitted reports that demonstrate consistent acts of noncompliance that negatively impact the public.

GO 133-D introduced an enforcement framework, consisting of fines for three out of the five standards: Out of Service (OOS) repair interval reports, Customer Trouble Reports, and answer time reports. Communications service providers that fail to meet the service quality minimum standard enter chronic failure status in the third month and are fined annually for each month³⁴ that they fail to meet the standard. Fines are assessed based on the size of the communications service provider relative to the number of access lines in California. The communications service provider submits the fine calculation to the Commission annually via Tier 2 advice letter, with a declaration of intent to pay or an alternative proposal to invest double the fine amount back into its network. Since implementation of GO 133-D, communications service providers have generally met the Customer Trouble Report and answer time report standards, despite occasional lapses in compliance.³⁵

³³Resolution M-4846, Attachment 1, Appendix I, p. 19. *Commission Enforcement Policy and Penalty Assessment Methodology*. Last Accessed May 6, 2022 at: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M348/K036/348036813.pdf>.

³⁴ GO 133-D Section 9.1.

³⁵ AT&T missed the standard three times in a twelve-month period in 2019. Resolution T-17721

However, widespread noncompliance with the out-of-service interval standard existed well before the Commission implemented GO 133-D. The Network Exam Phase 1 Report revealed that AT&T’s service outage performance deteriorated over the 2010-2017 period, when the GO 133-C and eventually GO 133-D standards were in effect.³⁶ Verizon California/Frontier California has failed to meet the minimum standard reporting levels since 2012.³⁷ The Network Exam Phase 1 Report found that communities with the lowest household incomes tend to exhibit the highest trouble report rates, the longest out of service durations, and the lowest percentage of outages cleared in 24 hours.³⁸ This poor service quality directly harms customers. Therefore, the Commission must consider an overhaul of the enforcement framework to better serve the public interest. In particular the alternative proposal in lieu of fines has proven to be ineffective in holding communications service providers accountable.

2. The Commission Should Modify GO 133-D’s Fines to Scale to the Maximum Penalty.

As recommended by the Network Exam Report, the Commission should increase the penalties for noncompliance.³⁹ The current table limits the fine amount to \$25,000 per day of violation, which results in a \$750,000 maximum fine amount per month. The Commission has authority to impose larger penalties. Pursuant to Public Utilities Code (PU Code) Section 2107, the Commission may impose a fine of “not less than five hundred dollars (\$500), nor more than one hundred thousand dollars (\$100,000), for each offense. In cases of a continued violation, each day’s continuance thereof shall be a

Approving AT&T California (U-1001-C) Advice Letter 48205A, setting forth General Order 133-D fines for failing to meet service quality performance standards in Year 2019, p.8.

³⁶ Network Exam Report, p. 522. Available as of May 6, 2022 at <https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/service-quality-and-etc/network-exam-of-att-and-frontier-verizon>

³⁷ Performance in Out of Service Repair Interval Measure from 2012 – 2018 AT&T and Frontier. Available as of May 6, 2022 at https://files.cpuc.ca.gov/Telco/ServiceQualityReports/2019/GR1_AT&T%20and%20Frontier_%202012-2018%20OOS.pdf.

³⁸ Network Exam Report, p. 527

³⁹ Network Exam Report, p. 524

separate and distinct offense.⁴⁰ Limiting the penalty amount in GO 133-D has proven to be ineffective in steering the communications service providers to correct the deficiencies in their networks.

The Commission should modify the fine calculation in GO 133-D so that fines are measured in accordance with the severity of the offense and issued timely to deter further violations. First, the fine should be the maximum amount allowable under the PU Code Section 2107. Second, the fine amount should scale over time in consideration of the increasing harms violations of GO 133-D has on customers and the Commission's regulatory process. Increasing and scaling the fine amounts would incentivize communications service providers to prioritize correcting the violations before the fine amount scales to the next tier. Lastly, the fine amount should be calculated at the tier of the longest continued violation, allowable under the PU Code Section 2108. For example, if a violation occurred continuously for four months, the provider shall be fined four months total at tier of \$100,000 per day, for the number of days that total four months. Each separate and distinct day contributes to poor service quality, and considering the totality of the offense, each day should be measured equally as the same fine amount tier up to the last day of violation occurred.

Table 3 below shows proposed tabulations for the OOS repair interval report fine, which is the service quality standard that some communications service providers have repeatedly failed to meet. These amounts should be a baseline and can be modified by staff in relation to the Commission's penalty assessment methodology under GO 133-D Section 7 regarding staff investigations, and in partnership with other enforcement tools such as customer credit refunds.

⁴⁰ Public Utilities Code Section 2108. Available as of May 6, 2022 at https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC§ionNum=2108.

Table 3: Proposed Modifications to Out of Service Repair Interval Level Fine

Duration Tier	1st Consecutive Month	2nd Consecutive Month	3rd+ Consecutive Months
Fine Per Day	\$25,000 per day	\$50,000 per day	\$100,000 per day
Days in a Month (for all months)	30 days	30 days	30 days
Base Fine per Month	\$750,000	\$1.5 Million	\$3 million

The fine structure outlined should apply to the different type of reports and to all communications services that will be considered under GO 133-D. The other two GO 133-D standards associated with a penalty table, Customer Trouble Reporting and answer time reporting, already have a table of scaling penalties. However, the Commission should enforce all three offenses with the same fine tabulation.

3. The Commission Should Remove the Alternative Proposal for Investment in Lieu of Fines from the GO 133-D Enforcement Framework.

Another characteristic of GO 133-D’s enforcement framework is the alternative proposal for mandatory corrective action (alternative proposal). In lieu of fines, GO 133-D Section 9.7 allows chronically failing communications service providers⁴¹ to request to substitute a network investment instead of a fine, of twice the fine amount. The communications service provider must support the alternative proposal with financial documents that demonstrate that the investment project is designed to address a service quality deficiency and improve the service quality in a measurable way within two years.⁴² This option has undermined GO 133-D’s penalty mechanism. For example, the

⁴¹ GO 133-D Section 9.1: “chronic failure status” is failure to meet the minimum standard for three consecutive months.

⁴² GO 133-D Section 9.7.

Commission fined AT&T \$3,222,000⁴³ for failure to meet out-of-service repair interval standards in 2019. AT&T proposed to invest \$6,444,000 in projects to improve infrastructure, particularly in existing copper facilities; however, Staff denied the proposal, citing concerns that the AT&T's proposal to spend \$11,800,000 over the past two years had improved the network.⁴⁴

This option has not been effective in promoting compliance with GO 133-D. The alternative proposal lacks metrics for success, a timeline for results, and sufficient oversight.⁴⁵ Communications service providers choosing this alternative have neither improved service quality nor met the service quality metrics going forward.⁴⁶ Some communications service providers have even failed to demonstrate that the alternative investment is incremental to their normal operating and capital costs. Overall, these investments have not moved the communications service providers out of chronic failure status. The AT&T case above shows that for some providers, network deterioration so severe that the investment amount calculated pursuant to the alternative proposal is insufficient to improve service quality. To significantly improve service quality will require an investment amount beyond the alternative proposal, or through other incentives, to incentivize providers to improve its network.

4. The Commission Should Require Customer Credit Refunds in the Enforcement Framework.

The Commission should require customer refunds as a corrective measure to incentivize compliance for communications service providers in chronic failure status, coupled with the fine amounts above. The Commission has used customer refunds as an enforcement tool as a way to “to return funds to the victim which were unlawfully

⁴³ Resolution T-17721, p. 12.

⁴⁴ Resolution T-17721, p. 4.

⁴⁵ Decision 18-10-058, p. 26. *Order Modifying Decision (D.)16-08-021 on Issue of Fines for CLECs and Denying Rehearing of Decision as Modified*. Available as of May 6, 2022 at <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M234/K300/234300754.PDF>

⁴⁶ P.21-10-003, p. 29.

collected by the public utility for unreasonable, excessive or discriminatory amount.”⁴⁷ Currently, GO 133-D mandates that URF carriers and GRC ILECs utilize their existing tariff or customer guidebook provisions for customer refunds.⁴⁸ However, it is crucial to implement an automatic refund mechanism within GO 133-D to standardize enforcement and reporting across communications service providers. Standardized enforcement would better protect all customers and begin to provide relief for customers of communications service providers in chronic failure status.

The Commission’s enforcement policy calls for meaningful deterrents that are adequate remedies.⁴⁹ The first method is “1. Refunding or depriving the economic benefit gained by the noncompliance.”⁵⁰ This enforcement mechanism should be used as a tool for progressive enforcement, in addition to fines. For example, after six months, if a communications service provider has not corrected its violation(s), the communications service provider will implement refunds. The refund policy would require communications service providers in chronic failure status to refund customers a percentage of their bill or a set dollar amount equal to the number of days that failed to meet service standards. Issuing refunds proportion to the harm would require the service providers to alleviate some of the harm that customers experienced due to the poor service offered by the service providers.

Lastly, that the Commission should recognize that enforcing service quality for wireless communications service providers will differ from enforcement of POTS communications service providers, because wireless customers are more mobile in nature and don’t have customer premises equipment. However, wireless customers also face harm from poor service quality, such as dropped calls, and should receive customer

⁴⁷ Public Utilities Code Section 734. Available at https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PUC§ionNum=734.

⁴⁸ GO 133-D, Section 8.

⁴⁹ Resolution M-4846, Attachment 1, p. 3. Available at: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M348/K036/348036813.pdf>

⁵⁰ Resolution M-4846, Attachment 1, p. 3. Available as of May 6, 2022 at: <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M348/K036/348036813.pdf>

credits during periods of egregious service quality outages. Measuring harm to wireless customers due to poor service quality is complex because they are not served from a single wire center, so determining how to distribute customer credits would be more complicated. If the Commission develops service quality standards for wireless communications service providers, it should consider an enforcement mechanism similar to customer credits for wireless customers as well. To determine how to implement this mechanism, the Commission should hold a workshop to examine how wireless service providers identify their customers and if it is possible to identify customer accounts that have issues with call failure or dropped calls.

E. The Commission Should Consider Service Quality Metrics for Broadband and Wireless Data Services ⁵¹

The OIR asks if the Commission should adopt service quality metrics and standards for broadband service.⁵² Customers are not satisfied with broadband service quality.⁵³ ACSI data notes that ISPs are rated at 65, an average “D” grade.⁵⁴ Since 2013, ISPs have ranked last, or tied for last with television service, in customer satisfaction in each year except 2020 as shown by Figures 2 and 3 below. Since the ACSI has been gathering customer satisfaction data, ISPs have never improved, and in 2021, ISPs were rated nine points lower than wireless service providers and six points lower than landline phone service providers.⁵⁵

⁵¹ The Commission has assigned this as a Phase 2 issue.

⁵² OIR Section 3.2, p. 17.

⁵³ *Reply of the Public Advocates Office to Parties Responses on the Petition for Rulemaking to Amend General Order 133-D to Modernize Minimum Service Quality Standards* filed November 15, 2021 in P. 21-10-003, p. 11.

⁵⁴ ACSI Benchmarks ISPs. https://www.theacsi.org/index.php?option=com_content&view=article&id=147&catid=&Itemid=212&i=Internet+Service+Providers.

⁵⁵ ACSI Benchmarks for all industries. [Benchmarks By Industry \(theacsi.org\)](https://www.theacsi.org/benchmarks-by-industry).

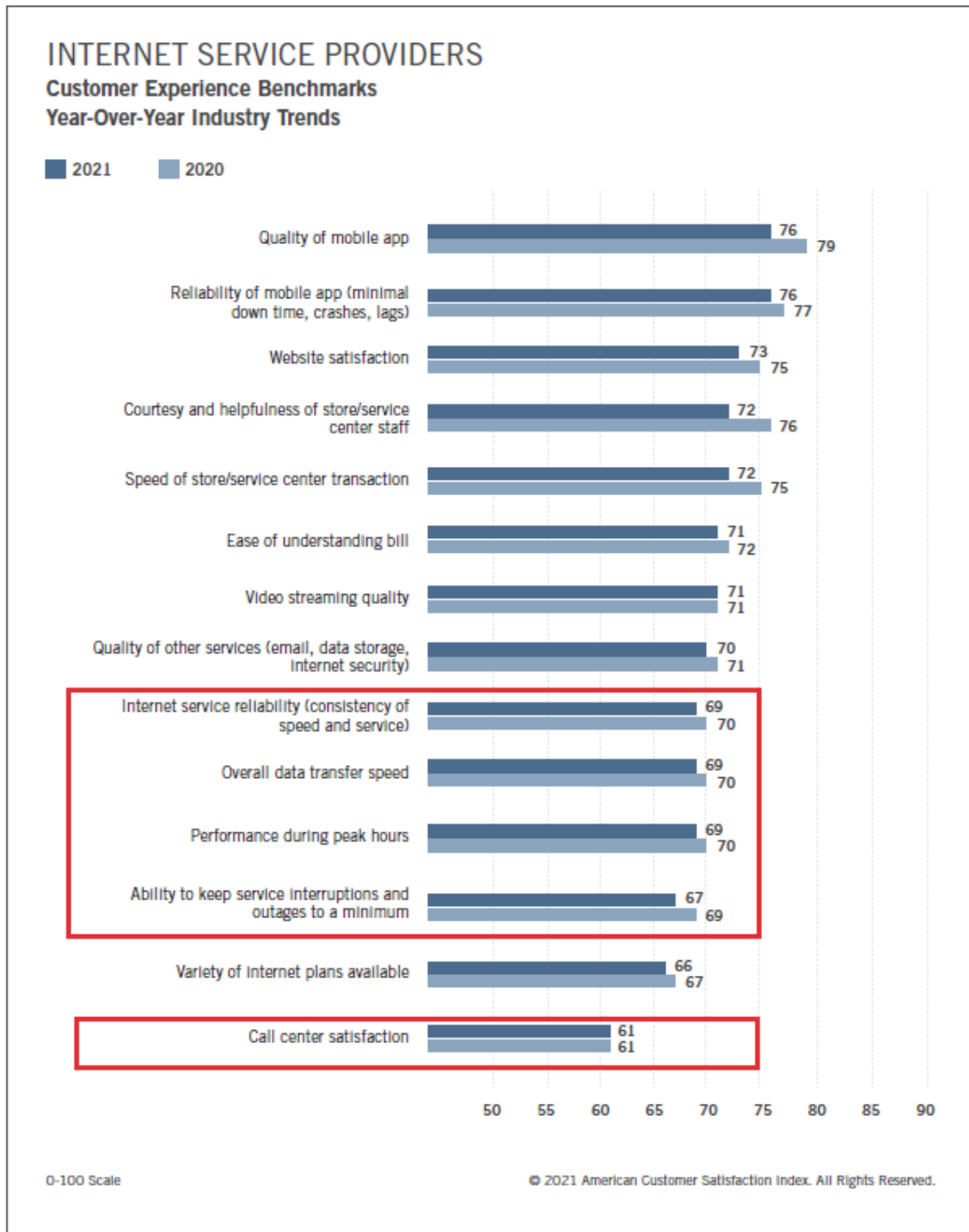
**Figure 2: Excerpt from ACSI Benchmarks by Industry 2007-2021
(Red Outline Added)**

Industry Name	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21
Cell Phones	70	71	72	76	75	74	76	78	78	79	79	79	79	80	79
Personal Computers	75	74	75	78	78	80	79	78	77	78	77	77	78	78	79
Wireless Phone Service	68	68	69	72	71	70	72	72	70	71	73	74	75	74	74
Investor-Owned Energy Utilities					74	76	77	75	74	72	75	75	73	72	72
<u>Municipal Energy Utilities</u>					73	76	76	76	73	68	72	75	73	72	71
Landline Phone Service	70	73	72	75	73	70	74	73	69	70	70	70	71	70	71
Subscription Television Service	62	64	63	66	66	66	68	65	63	65	64	62	62	64	65
Internet Service Providers							65	63	63	64	64	62	62	65	65

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As demonstrated by the ACSI data, ISPs are rated at the bottom of the ACSI’s customer satisfaction rankings. Furthermore, as Figure 3 shows, ISP customers are most dissatisfied with call centers, outages, broadband speeds, reliability, and peak hour performance of their broadband service.

**Figure 3: ACSI Customer Experience Benchmarks for ISPs 2020-2021
(Red Outline Added)⁵⁶**



⁵⁶ ACSI Telecom Industry Study, [21jun_acsi-telecom-STUDY.pdf](https://www.theacsi.org/21jun_acsi-telecom-STUDY.pdf) (theacsi.org).

Furthermore, rural areas are heavily affected by service quality shortfalls. Communications Division's *Report of the Communications Division Pursuant to Ordering Paragraph 3 of Decision 16-12-025 Analyzing the California Telecommunications Market, December 2018* (CD Communications Report) found a significant difference between rural and urban areas. Some rural areas typically have slower broadband speeds available to residential customers, with 46% of rural households lacking access to broadband speeds of at least 25/3 Mbps.⁵⁷ For 58% of rural Americans access to high-speed Internet is a problem.⁵⁸ The *2017 CalSPEED: Mobile Broadband, An Assessment* report found a persistent mobile digital divide, with rural areas having roughly 33% poorer wireless broadband service than urban areas in terms of speeds, latency, jitter, and packet loss and that "[r]ural and tribal VoIP quality remains degraded".⁵⁹ Rural areas suffer from a lack of investment and poor maintenance, which leads to deteriorated service quality.⁶⁰

As such, the Commission should consider extending the existing wireline service quality standards to broadband service as specified in Attachment B to these comments, create new service quality standards to measure broadband network quality, and explore standards for measuring and standardizing wireless data network service quality as specified in Attachment A to these comments.⁶¹ These standards are necessary to help customers in rural areas receive good service quality.

⁵⁷ CD Communications Report, p. 19.

⁵⁸ Pew Research Center, Quarter of Rural Americans say access to high-speed Internet is a problem. <https://www.pewresearch.org/fact-tank/2018/09/10/about-a-quarter-of-rural-americans-say-access-to-high-speed-internet-is-a-major-problem/> and Washington Post, talking about how lack of connectivity has hurt rural first responders and tribal communities. <https://www.washingtonpost.com/technology/2021/08/11/infrastructure-bill-cellular-spending/>

⁵⁹ Commission *CalSPEED: California Mobile broadband - An Assessment - Spring 2017*, by Novarum, Inc. pp. 1-2, which can be found here: [Mobile broadband Testing \(ca.gov\)](https://www.california.gov/infrastructure/broadband-testing)

⁶⁰ Examination of the Local Telecommunications Networks and Related Policies and Practices of AT&T California and Frontier California, Chapter 1, p. 2. Communications service providers focused investment on higher income communities, there was persistent disinvestment elsewhere. Unstable and non-existent connections is a problem in rural areas across the country as CNN notes: <https://www.cnn.com/2020/04/29/us/rural-broadband-access-coronavirus-trnd/index.html>

⁶¹ While broadband is addressed in Phase 2, we encourage these issue be considered as part of the OIR.

1. GO 133-D’s Existing Standards Should Apply to Wireline Broadband Service.⁶²

The OIR asks whether the Commission should adopt service quality metrics and standards for broadband service.⁶³ The Commission should consider extending the existing service quality standards to wireline broadband service consistent with Table 1 above and specified in Attachment A and B to these comments. These standards should use the same enforcement mechanisms implemented in Phase 1 of this proceeding, with customer refunds and scaling penalties. Generally, broadband service quality metrics should be reported and submitted similarly to existing GO 133-D requirements at the wire center, or wire center equivalent such as a headend and mobile switching center. The Commission will need to adapt the reporting definitions to include cable service providers and wireless service providers. Attachment B has a definition which incorporates broadband service providers and wireless service providers into the term “facilities-based carrier” to apply the existing service quality standards to these service providers.

2. The Commission Should Consider New Service Quality Metrics for Broadband Service.

The specific broadband and wireless data standards that the Commission should consider are latency, broadband speeds, jitter, packet loss, packet reordering, and community service outage standards, as specified in Attachment A to these comments. These standards are well-established metrics used in the telecommunications industry to assess the quality of telecommunications networks. Further, these standards are based on technical benchmarks required for smooth video communications and voice communications over Internet Protocol based networks. As an example, Microsoft has established network performance targets, shown in Figure 4, below. Reliable broadband connections are critical for distance learning, telehealth, and teleworking, and the

⁶² We acknowledge that the Commission has assigned this issue to Phase 2 of the proceeding but encourage it remain for consideration as part of the OIR.

⁶³ OIR, p. 17.

standards that the Commission implements should be based on ensuring such connections.

Figure 4: Microsoft Performance Requirements from a Skype for Business Client to Microsoft Network Edge⁶⁴

Metric	Target
Latency (one way)	< 50ms
Latency (RTT or Round-trip Time)	< 100ms
Burst packet loss	<10% during any 200ms interval
Packet loss	<1% during any 15s interval
Packet inter-arrival Jitter	<30ms during any 15s interval
Packet reorder	<0.05% out-of-order packets

The Commission should consider standards for the above listed additional service quality metrics to measure whether communications service providers are offering customers a baseline level of high-quality, reliable service. These standards have been used in FCC programs,⁶⁵ and many were established by standard-setting bodies such as the International Telecommunications Union (ITU-T)⁶⁶ or industry groups⁶⁷ that measure service quality.

⁶⁴ Media Quality and Network Connectivity Performance in Microsoft Teams: [Media Quality and Network Connectivity Performance - Skype for Business Online | Microsoft Docs](#)

⁶⁵ *Declaratory Ruling, Second Report and Order, and Order on Reconsideration*, FCC, July 15, 2015 (FCC 16-90), para. 95, p. 34.

⁶⁶ ITU-T Recommendation E.807, February 2014, *E.807: Definitions, associated measurement methods and guidance targets of user-centric parameters for call handling in cellular mobile voice service (itu.int)*, Parameters 2 and 3, p. 2 available at <https://www.itu.int/rec/T-REC-E.807-201402-I> and International Telecommunications Union Recommendation G.1050, 2007, Tables 5 and 6.

⁶⁷ Rootmetrics, Mobile Network Performance in the US, <https://rootmetrics.com/en-US/content/us-state-of-the-mobile-union-2H> and Ookla Speedtests Global Index found at <https://www.speedtest.net/global-index/united-states>.

The FCC’s technology transition program set a standard for Latency and Packet Loss.⁶⁸ Communications service providers participating in the FCC’s technology transition program were expected to maintain round trip latencies of 100 milliseconds or less in 95 percent of measurements during peak use periods.⁶⁹ The FCC notes that these standards are informed by the ITU-T recommendations for reasonable network management practices.⁷⁰ People using applications reliant on real-time transmission of data, such as video teleconferencing for work or telehealth purposes as well as people with disabilities using assistive devices, need low latencies to function well. Similarly, the Commission should consider the metrics proposed in Tables 4 and 5 below for Phase 2 which include standards and performance measurements to determine whether communications service providers are providing customers with reliable, high-quality service.

Table 4: Applicability of New Technical Service Quality Metrics

Standard	Applicable Services
Delivered Network Speeds	Broadband Services
Latency	Broadband Services, Wireless Data Services
Jitter	Broadband Services, Wireless Data Services
Packet Loss	Broadband Services, Wireless Data Services
Packet Reorder	Broadband Services
Community Outage	POTS, Interconnected VoIP, and Broadband Services

⁶⁸ FCC 16-90, para. 94, 95, pp. 33-34

⁶⁹ FCC 16-90, para. 94, 95, pp. 33-34.

⁷⁰ FCC 16-90, para. 95, p. 34.

Table 5: Summary of New Technical Service Quality Metrics

Broadband Network Technical Metric	Definition
Delivered Network Speeds	Delivered Network Speeds refers to network speeds delivered to a customer’s premises. It is measured as a percentage of the average network speeds at a customer’s premises during divided by speeds a customer is subscribed to. Higher percentages of delivered network speeds would indicate higher quality service. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.
Latency	Latency is the measure of time it takes in milliseconds, defined as either one-way or round trip, for a packet to travel from one point in a network to another. It typically increases as the distance between points increases and congestion of the network increases. Latency decreases as the distance between points decreases. Lower latency is one indicator of higher service quality, as providers should manage network traffic for minimal latency. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.
Jitter	Jitter is the variance in the end-to-end delay of information traveling on a network. Jitter is measured through the difference between the actual time of arrival and the expected time of arrival. Jitter is expressed in milliseconds and can be considered the difference in latency between different information packets. Lower jitter is one indicator of higher service quality, as providers should manage network traffic for minimal jitter. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.
Packet Loss	Packet Loss is defined by the event where sent information is not acknowledged by the receiver, or it is received with a round trip latency delay that is greater than 3 seconds. Packet loss is measured as a percentage of packets lost compared to packets sent. Small packet loss is one indicator of higher service quality, as providers should manage network traffic to ensure minimal or no packets are lost. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.
Packet Reordering	Packet Reordering happens when packets arrive at their destination in the wrong order. Packets which arrive in the wrong order can lead to words in a video call sounding scrambled or out of order. This standard would be measured by wire center, mobile switching center, headend, or other wire center equivalent.
Community Outage	An outage that limits a telecommunication service provider’s end user’s ability to make calls, receive emergency notifications, or access basic internet functionality (as defined by Decision 20-07-011) that lasts for at least 30 minutes and affects at least 1) 100 end users served by a single wire center or headend or 2) at least 25% of end users served by a wire center or headend with fewer than 100 end users.

F. The Commission Should Consider Service Quality Standards for Wireless Data Services.

In addition to considering broadband service quality standards, the Commission should explore ways to measure and track the service quality of wireless data. The Commission has used CalSPEED information to measure wireless service quality data on latency, jitter, and packet loss.⁷¹ The Commission should consider those standards for wireless data quality as outlined in Table 4 above during Phase 2 of this proceeding. In addition, the Commission should investigate what metrics and key performance indicators wireless communications service providers keep track of. Understanding how wireless service providers determine where to invest in new cell infrastructure would inform what standards are needed to ensure reliable service in underinvested rural and tribal areas.

III. CONCLUSION

It is a matter of public health and safety to establish minimum service quality standards for today's essential communications services to protect customers. The Commission should adopt the standards outlined in Attachments A and B to these comments, and apply service quality standards to broadband, wireless, and interconnected VoIP services.

⁷¹ CPUC CalSPEED App on the AppStore found at: <https://apps.apple.com/us/app/calspeed/id1063788456>

Respectfully submitted,

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Attachment A: Proposed Service Quality Metrics and Standards Additions to General Order 133-D

1. General

1.3 Definitions.

- aa. Service Area: A contiguous area where a facilities-based carrier provides service to customers with lines from a central office, or functional equivalent including but not limited to mobile switching center and headend. A service area can include multiple central offices, or functional equivalents, if the inter-office transport facilities that connect the two central offices, or functional equivalents, does not leave the contiguous area of where either central office serves customers.
- ab. Switching Center: Analogous to a wire center. A Switching Center is composed of one or more switches that facilitates call set-up, release, and routing.
- ac. Failed Call: A call that is unable to initiate due to adverse network conditions such as traffic and congestion.
- ad. Dropped Call: A prematurely terminated call on a telephone network due to adverse network conditions, not the actions of an end user.
- ae. Packet: A formatted unit of data carried by a packet-switched network to convey information.
- af. Peak Hours: Between 7:00 PM and 11:00 PM Pacific Time.
- ag. Ring back Tone: An audible ringing signal tone heard by the originator of a telephone call when attempting to call the receiver.
- ah. Community Anchor Institution: Schools, libraries, health care institutions, public safety facilities, community colleges, and other institutions of higher education.
- ai. Customer Premises: The location or locations occupied by the Customer to which a facilities-based carrier delivers service.

4. Major Service Interruption

- e. Cell Site Outage. An outage that limits a facilities-based carriers' end user's ability to make calls, received emergency notifications, or access basic internet functionality (as defined by Decision 20-07-011) that lasts for at least 30 minutes and affects at least 25% of a carrier's coverage in a single zip code.
- f. Community Outage. An outage that limits a facilities-based carriers' end user's ability to make calls, receive emergency notifications, or

access basic internet functionality (as defined by Decision 20-07-011) that lasts for at least 30 minutes and affects at least 1) 100 end users served by a single wire center or headend or 2) at least 25% of end users served by a wire center or headend with fewer than 100 end users.

10. Minimum Network Service Quality Benchmarks

10.1 Call Failure Rate – Applies to Time Division Multiplex (TDM)-based¹ voice services, Interconnected Voice over Internet Protocol (VoIP) services,² and Wireless services offered by facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a Carrier of Last Resort (COLR).³

- a. Description. Call Failure Rate is a measure of the number of calls that are unable to initiate due to adverse network conditions such as traffic and congestion. Calls that are terminated before initiation due to actions of the customer are not considered failed calls. Call Failure Rate applies to residential and small business customers.
- b. Measurement. Number of calls attempted by end users minus the number of calls successfully initiated by the network divided by the total number of calls attempted by end users.
- c. Minimum Standard Reporting Level. Fewer than 1% failed calls averaged monthly.
- d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.
- e. Reporting Frequency. Compiled monthly, reported quarterly.

¹ TDM is defined in GO 133-D Section 1.3 (t.) as referring to traditional telephone service.

² VoIP Provider is defined in GO 133-D Section 1.3 (m.).

³ COLR is defined in GO 133-D Section 1.3 (d.) as a carrier required to serve upon request all customers within its designated service areas.

- 10.2 Call Drop Rate – Applies to TDM-based voice services, Interconnected VoIP services, and Wireless services offered by facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- a. Description. Call Drop Rate is a measure of the amount of prematurely terminated calls on a communications network. A call is dropped when it is ended by the network, not either user. Call Drop Rate applies to residential and small business customers.
 - b. Measurement. Number of calls ended prematurely divided by total numbers of calls placed over the network.
 - c. Minimum Standard Reporting Level. Less than 1% dropped calls averaged monthly.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.
 - e. Reporting Frequency. Compiled monthly, reported quarterly.
- 10.3 Call Setup Time – Applies to TDM-based voice services, Interconnected VoIP services, and Wireless services offered by facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- a. Description. Call Setup Time is the amount of time it takes a network to connect the calling device to the called device and produce a ringing tone. Carriers will select a random sample of 100 calls from each reporting unit.
 - b. Measurement. The time in seconds from an end user initiating a call to the called device producing a ring back tone to the originating device compiled monthly.
 - c. Minimum Standard Reporting Level. Mean Call Setup times of less than ten seconds.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location.

A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.

e. Reporting Frequency. Compiled monthly, reported quarterly.

10.4 Repeat Trouble Reports – Applies to TDM-based voice services, Interconnected VoIP services, Wireless services, and Broadband services offered by General Rate Case Incumbent Local Exchange Carriers (GRC ILECs),⁴ facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.

a. Description. Repeat Trouble Reports are service affecting and out of service trouble reports submitted by the same customer or user relating to dissatisfaction with communication service provider's services within 30 days after a previous trouble report was cleared for the same issue.

b. Measurement. Repeat Trouble Reports received by the carrier are counted monthly and related to the total working lines within a reporting unit.

c. Minimum Standard Reporting Level. 1 repeat trouble reports per 100 working lines.

d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.

e. Reporting Frequency. Compiled monthly, reported quarterly.

10.5 Delivered Network Speeds – Applies to Broadband Services and Wholesale Broadband Services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers.

⁴ GRC ILECs is defined in GO 133-D Section 1.3 (j.) as a General Rate Case Incumbent Local Exchange Carrier. A GRC ILEC is a designated COLR in its franchise territories and is regulated through cost-of-service reviews by the Commission.

- a. Description. Delivered Network Speeds refers to network speeds delivered to a customer's premises as a percentage of the average network speeds at a customer premises during peak hours divided by speeds a customer is subscribed to. Delivered Network Speed applies to Community Anchor Institutions, residential, and small business customers.
 - b. Measurement. Average Delivered Network Speeds during Peak Hours divided by Subscribed speeds at a customer premises. Carriers will select a random sample of 50 customer premises from each reporting unit.
 - c. Minimum Standard Reporting Level. 80 % Mean Delivered Network Speeds during Peak Hours of 7 pm to 11 pm averaged monthly.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.
 - e. Reporting Frequency. Compiled monthly, reported quarterly.
- 10.6 Latency – Applies to Interconnected VoIP services, Wireless services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- a. Description. Latency is the measure of time it takes in milliseconds, defined as either one-way or round trip, for a packet to travel from one point in a network to another. Latency applies to Community Anchor Institutions, residential, and small business customers.
 - b. Measurement. Latency will be measured from a customer premises to a measurement server or to an interconnection point for hand-off to the public Internet or another network. Carriers will select a random sample of 50 customer premises from each reporting unit.
 - c. Minimum Standard Reporting Level. Mean Latency of less than 100 milliseconds round trip for 90% of reporting locations. Carriers should report their mean Latency during Peak Hours of 7 pm to 11 pm averaged over a reporting month.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines

should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.

e. Reporting Frequency. Compiled monthly, reported quarterly.

10.7 Jitter – Applies to Interconnected VoIP services, Wireless services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any facilities-based Carrier with fewer than 5,000 customers that is a COLR.

a. Description. Jitter is the variance in end-to-end delay of information travelling on a network. Jitter is measured through the difference between actual time of arrival and expected time of arrival. Jitter applies to Community Anchor Institutions, residential, and small business customers.

b. Measurement. Jitter will be measured from a customer premises to a measurement server or to an interconnection point for hand-off to the public Internet or another network. Carriers will select a random sample of 50 customers from each reporting unit.

c. Minimum Standard Reporting Level. Mean Jitter of less than 50 milliseconds round trip for 90% of reporting locations. Carriers should report their mean Jitter during Peak Hours+ of 7 pm to 11 pm averaged over a reporting month.

d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.

e. Reporting Frequency. Compiled monthly, reported quarterly.

10.8 Packet Loss – Applies to Interconnected VoIP services, Wireless services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.

- a. Description. Packet Loss is defined by the event where sent information is not acknowledged by the receiver or it is received with a round trip latency delay that is greater than 3 seconds. Packet Loss applies to Community Anchor Institutions, residential, and small business customers.
 - b. Measurement. The number of packets sent over the network minus the number of requested packets received divided by the number of packets sent. Carriers will select a random sample of 50 customer premises from each reporting unit.
 - c. Minimum Standard Reporting Level. Fewer than 1% mean packet loss and averaged monthly.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.
 - e. Reporting Frequency. Compiled monthly, reported quarterly.
- 10.9 Packet Reordering – Applies to Interconnected VoIP services, Wireless services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- a. Description. Packet Reordering is defined by the event where sent information arrives at the receiver in the incorrect order. Packet Reordering applies to Community Anchor Institutions, residential, and small business customers.
 - b. Measurement. The number of packets arrived out of order minus the number of requested packets received divided by the number of packets sent. Carriers will select a random sample of 50 customer premises from each reporting unit.
 - c. Minimum Standard Reporting Level. Fewer than 0.1% mean packet arriving out of order, averaged monthly.
 - d. Reporting Unit. Service area, switching center, or central office, whichever is smaller. A switching center with fewer than 100 lines should be combined with other central offices within the same location. A remote switching unit or node with fewer than 100 lines should also be

added to its host switch. Carriers that do not have service areas, switching centers, or central offices shall report at the smallest reporting unit. All reporting carriers shall submit the raw data included in the report.

- e. Reporting Frequency. Compiled monthly, reported quarterly.

Attachment B: Proposed Revisions to General Order (GO)133-D

1. General

1.3 Definitions.

- i. Facilities-based Carriers: A telephone corporation, broadband service provider, wireless carrier, or interconnected Voice over Internet Protocol (VoIP) provider that owns or controls facilities used to provide communications for compensation, including the line to the end-user's location. A local exchange carrier providing service solely by resale of the Incumbent Local Exchange Carrier (ILEC)'s local exchange services is not a facilities-based carrier. By Commission Decision (D.) 95-12-057, facilities-based carriers must file an environmental assessment report and undertake mitigation efforts addressing any adverse environmental impacts associated with their construction activities under their Certificate of Public Convenience and Necessity.
- t. TDM – Time division multiplexing. For the purposes of the GO, TDM refers to traditional telephone service and traditional telephone service emulated on packet switched networks.

3. Minimum Telephone Service Measures

- 3.1 Installation Interval - Applies to TDM-based voice services, Interconnected VoIP services, and Broadband services offered by General Rate Case (GRC) ILECs, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a Carrier of Last Resort (COLR).
- 3.2 Installation Commitments - Applies to TDM-based voice services, Interconnected VoIP services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- 3.3 Customer Trouble Reports – Applies to TDM-based voice services, Interconnected VoIP services, Wireless services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- 3.4 Out of Service Repair Intervals – Applies to TDM-based voice services, Interconnected VoIP services, and Broadband services offered by GRC ILECs, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.
- 3.5 Answer Time – Applies to TDM-based voice services, Interconnected VoIP services, Wireless services, and Broadband services offered by GRC

ILECS, facilities-based Carriers with 5,000 or more customers and to any Facilities-based Carrier with fewer than 5,000 customers that is a COLR.