

14 | ILEC RESPONSES TO SERVICE OUTAGES: VoIP SERVICES

Key findings addressed in this Chapter

- When an ILEC legacy circuit-switched POTS customer orders some form of broadband access from the ILEC, the carrier will generally migrate the customer's voice telephone service to a VoIP offering that is delivered, together with the customer's broadband Internet access, via the digital service.
- ILEC VoIP services are provided out of the same serving wire center that had been used for legacy circuit-switched services, but the VoIP switch itself can be located anywhere on the Internet. A service interruption or outage can arise in the local distribution infrastructure or anywhere beyond that point on the ILEC's IP network.
- Most AT&T California VoIP services are provided using DSL technology over a hybrid Fiber-to-the-Node ("FTTN") / copper distribution architecture. However, AT&T's deployment of Fiber-to-the-Premises ("FTTP") has been increasing; by the end of 2019, some ████████ of all AT&T California VoIP customers were being served via FTTP.
- From 2012 through 2016, the percentage of AT&T California VoIP access lines that had experienced out-of-service conditions in any given month was decreasing steadily, but those gains were reversed after 2016.
- The average duration of all trouble and out-of-service conditions was also shrinking up until 2016, but both metrics saw large upward spikes, with outage durations increase from less than 30 hours prior to 2017 to around 50 hours from 2017 onward.
- Some 58.4% of the 3.3-million AT&T California VoIP trouble reports created during the 2012-2019 period involved distribution plant issues.
- In wire centers where both VoIP and POTS are offered and where trouble report data is available for both services, the relative incidence of VoIP service outages was 38.7% greater than it was for POTS over the full Phase 1/2 study periods.
- Frontier suffered large losses both of POTS and VoIP access lines since assuming control of the company on April 1, 2016 with POTS losses slightly higher, suggesting that the availability of FTTP-based FiOS has done little to help Frontier maintain its customer base overall.

- As of the end of December 2019, Frontier was serving only [REDACTED] residential VoIP subscribers, just under 50% of the VoIP lines in service as of the takeover date. In comparison, Frontier had experienced a far greater drop-off in legacy circuit-switched access lines over that same period
- Out of the 44,095 out-of-service reports provided for the period from April 2016 through December 2019, only 25,089, or about 56.9%, appear to be the result of Frontier plant or equipment issues or employee actions.

ILEC RESPONSES TO SERVICE OUTAGES: VoIP SERVICES

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Introduction

For more than a decade, traditional circuit-switched voice telephone services have been in the process of being replaced by Voice over Internet Protocol (“VoIP”) technology. VoIP requires the deployment of digital services to the customer’s premises with sufficient bandwidth to accommodate both voice telephony as well as the various other digital (typically Internet-based) services that are used by the customer. Twisted-pair copper “loops” that have traditionally been provided to almost all residential premises and to most business locations can support digital end-to-end services, but generally cannot support the bandwidth requirements of typical residential and business customers for the full suite of voice and broadband Internet applications, particularly streaming video. Substantially greater bandwidths can be achieved through the use of either of three other technologies – fiber-to-the-premises (“FTTP”), fiber-to-the-node (“FTTN”), or hybrid fiber/coax (“HFC”). FTTP and FTTN are the preferred approach to high bandwidth services for ILECs, whereas HFC is used primarily by cable TV operators. With both FTTN and HFC, fiber is extended to a “node” located relatively close to the customer, but not all the way to the customer’s premises. The potential bandwidth achievable via twisted pair copper or coaxial cable is inversely related to the physical length of that segment; by extending fiber to the neighborhood node, the length of the copper or coax segment can be minimized, thereby enabling greater bandwidth to be delivered to the customer’s premises. Verizon (now Frontier) has focused upon an FTTP strategy via the *FiOS* brand; AT&T has some FTTP, but its predominant approach has been toward FTTN.

When an ILEC legacy circuit-switched POTS customer orders some form of broadband access from the ILEC, the carrier will generally migrate the customer’s voice telephone service to a VoIP offering that is delivered, together with the customer’s broadband Internet access, via the digital service. AT&T California *does not* offer VoIP services to customers who do not also take broadband Internet access and/or video from the ILEC; Frontier had a similar policy up until July 2019, when it began offering VoIP service on a stand-alone basis.⁹⁵



When an ILEC legacy circuit-switched POTS customer orders some form of broadband access from the ILEC, the carrier will generally migrate the customer's voice telephone service to a VoIP offering that is delivered, together with the customer's broadband Internet access, via the digital service.

The term “interconnected VoIP” refers to VoIP telephone service that is capable of initiating and/or receiving telephone calls over the Public Switched Telephone Network (“PSTN”). VoIP service can be furnished by a carrier, such as an ILEC or a cable television MSO, or as a so-called “over-the-top” Internet application by providers such as Vonage, MagicJack and others. A form of interconnected VoIP known as “Session Initiated Protocol” (“SIP”) is used by

95. AT&T California Response to CD Data Request 11-A-25; Frontier California Response to CD Data Request 13-F-03(d).

businesses and other nonresidential customers where multiple voice paths (what would have been called “PBX trunks” in a circuit-switched world) are needed. When VoIP service is provided by an ILEC or a cable TV company, it is typically configured to operate over a dedicated subset, or “channel,” of the total Internet Protocol (“IP”) bandwidth that is being provided to the customer. “Over-the-top” services, which are purchased separately by the customer, typically share the same total available bandwidth with any other Internet activities that the customer is using. The customer’s Internet router can, however, be configured to afford priority to VoIP or other specific applications, if the customer has the technical knowledge to make the necessary “Quality of Service” (“QoS”) router settings. These settings enable over-the-top VoIP services to achieve results using shared Internet bandwidth that are roughly equivalent to those that are available through the use of “dedicated” VoIP bandwidth as provided by the carrier. Larger businesses that utilize SIP trunking obtained from an over-the-top provider may obtain dedicated IP bandwidth for this purpose that is separate and apart from their other IP applications.

Regulatory status of VoIP in California

In 2012, the California legislature adopted a new §710 of the California Public Utilities Code whose effect was to remove most aspects of any VoIP service from the CPUC’s regulatory jurisdiction.⁹⁶ §710 had included a “sunset” provision that became operative as of January 1, 2020; CD has advised us that §710 is no longer in effect and that the CPUC currently has resumed its jurisdiction over VoIP services. That notwithstanding, the ILECs continue to maintain that VoIP remains deregulated and that the Commission does not have jurisdiction with respect to this service. For example, in its response to a CD Data Request for certain VoIP-related data, Frontier asserts that:

Frontier notes that many of these questions seek irrelevant information that is unrelated to Frontier’s infrastructure, facilities and service quality and therefore, exceed the scope of the network examination authorized by Commission Decisions (D) 13-02-023 and D.15-08-041 and the scope of Commission General Order (G.O.) 133-D. Frontier also notes that several of the data requests seek granular information regarding Frontier’s unregulated VoIP services. Insofar as these questions are intended to bring VoIP within the Commission’s jurisdiction, it is contrary to federal law. See, e.g., *Vonage Holdings Corporation Petition for Declaratory Ruling Concerning and Order of the Minnesota Public Utilities Commission*, WC Docket No. 03•]211, *Memorandum Opinion and Order*, FCC 04-267 (rel. Nov. 12, 2004) ¶ 1 & n. 78 (confirming that interconnected VoIP is not subject to traditional telephone company regulations); *Minnesota PUC v. FCC*, 483 F.3d 570 (8th Cir. 2007) (affirming Vonage order); see also *Charter Advanced Services, LLC v. Lange*, 903 F.3d 715, 719 (8th Cir. 2018) (“[i]n the

96. Stats. 2012, Ch 733, Sec 3. (SB 1161) Effective January 1, 2013. Repealed as of January 1, 2020, by its own provisions.

absence of direct guidance from the FCC,” interconnected VoIP service should be treated as an “information service.”)⁹⁷

Notwithstanding this objection, Frontier California has generally been responsive to CD Data Requests pertaining to VoIP services.

Whether or not the sunset of §710 has the effect of reinstating the CPUC’s ratemaking authority with respect to VoIP services, as a practical matter the Commission no longer regulates most basic service rates in any event. When §710 was in effect, POTS customers were being migrated to VoIP either involuntarily or were being induced to switch to VoIP via the succession of POTS rate increases that AT&T and, to a lesser extent, Frontier, were implementing. The migration of POTS customers to VoIP services is typically triggered when the customer elects to subscribe for broadband Internet access and/or video from either ILEC; such involuntary migration has had the effect of diminishing, if not eliminating altogether, any regulatory recourse that may have been available to the POTS customer with respect to service quality issues. The reinstatement of the Commission’s jurisdiction with respect to VoIP services could help to eliminate this disparity.

Principal forms of digital services that support VoIP telephony

Most residential and small business customers that are provided with VoIP services are served via one of four technology platforms:

- *Digital Subscriber Line (“DSL”)*
- *Fiber-to-the-Node (FTTN)*
- *Fiber-to-the-Premises (FTTP)*
- *Hybrid fiber/coax (HFC)*

DSL. Digital services that are furnished over copper loops utilize “Digital Subscriber Line” (“DSL”) technology. As illustrated in Figure 14.1 below, copper-based distribution architecture utilized relatively small capacity (up to about 300 or 600 pair) cables that would run down individual streets or roads connecting individual customer premises to “remote terminals” where each of the individual pairs in these low-capacity cables would be “cross-connected” to individual copper pairs in large capacity (typically greater than 1200 pairs) “feeder cables.”

97. Frontier response to CD DR 13-F, cover letter dated August 7, 2020.

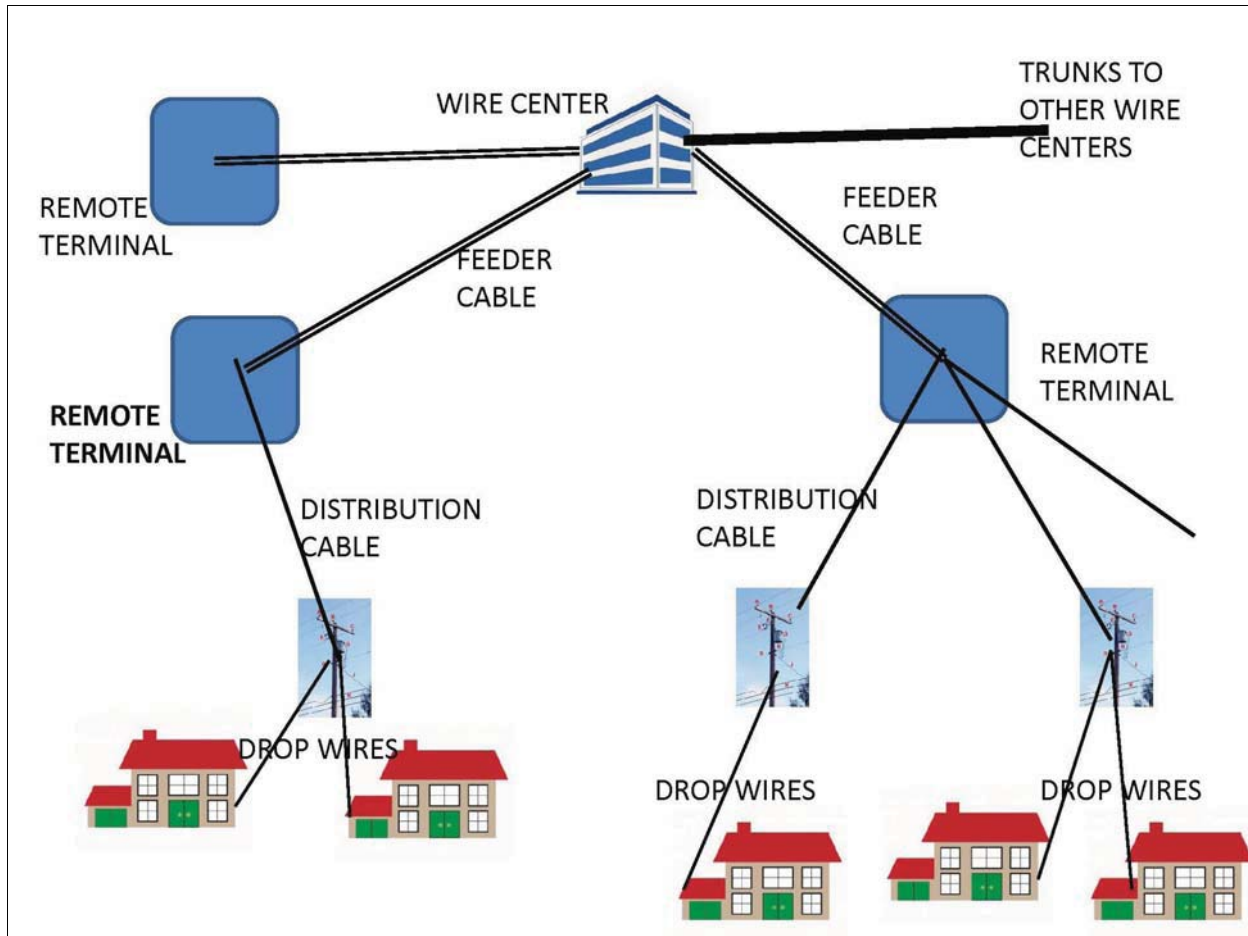


Figure 14.1. Principal components of an ILEC local distribution network.

The effective bandwidth (data rate) that is available with DSL is inversely related to the physical route length of the copper portion of the subscriber’s distribution network connection; if both the distribution and feeder cables involve copper wire, the total premises-to-central office route distance is controlling insofar as the effective DSL bandwidth that can be achieved. In general, DSL can only be provided where the aggregate length of the copper segment *route* (distribution + feeder) is less than about 18,000 route feet, which usually corresponds to about two miles of the straight-line distance, from the wire center.

FTTN. ILECs have been replacing copper feeder cables with fiber optic cables so as to shorten the length of the copper segment. The closer that fiber is brought to the ultimate customer premises, the greater the bandwidth that can be furnished to the end-user. In general, DSL without fiber can typically support bandwidths of around 1.0 megabits per second (“mbps”) or less to perhaps as much as 5 or 6 mbps depending upon route distance. With FTTN architecture, where the fiber segment is extended to within a few thousand feet of the customer, DSL may be capable of supporting up to 15 to 20 mbps, but rarely more than that. AT&T California’s

principal form of broadband Internet access is via FTTN architecture, although the company has been expanding its deployment of FTTP in a few areas.⁹⁸ A two-way VoIP telephone call requires around 100 kbps in each direction; however, since other activities may also be taking place over a customer's digital connection, a stable VoIP service generally requires a minimum bandwidth of about 3.0 mbps.

FTTP. ILECs may also provide Internet access (and VoIP) over a full fiber-to-the-premises architecture. Frontier obtained a substantial quantity of FTTP-served customer locations from Verizon through its 2016 acquisition. Verizon began deploying its *FiOS* FTTP infrastructure in the mid-2000s, although it largely discontinued most construction after 2010.⁹⁹ Frontier has not been able to provide the total number of homes passed by *FiOS*-capable FTTP facilities as of the April 1, 2016 acquisition date. Homes passed figures for October 2018 and 2019 were provided – [REDACTED] for October 2018, and 1,466,503 for October 2019.¹⁰⁰ As of December 2019, [REDACTED] of AT&T California VoIP customers were being served via FTTP.

HFC. Hybrid-fiber/coax is the architecture being used by cable TV MSOs such as Comcast and Charter to provide broadband Internet access and VoIP-based telephone services. HFC is a form of FTTN as used by ILECs, except that the “last mile” connection is provided by coaxial cable instead of twisted-pair copper wire. As with DSL, there is an inverse relationship between the route length of the coax segment and the bandwidth that can be supported, so cable MSOs have been bringing fiber closer to their customers so as to shorten the length of the coax segment. Unlike the ILECs' DSL-based hybrid fiber/copper approach, however, HFC is capable of supporting substantially higher bandwidths overall than DSL. Not surprisingly, cable MSOs have been far more successful both in attracting and in maintaining customers on their networks.

ILEC VoIP service architecture

Circuit-switched telephone services are provided out of central office switching equipment that is located either at the customer's serving wire center or, more recently, out of a remote service unit (“RSU”) that is connected, typically via a DS-3 (45 mbps) digital channel, to a “host” central office that may be located usually within 20 or 30 miles from the serving wire center, although in theory there is no particular distance limit for the host/remote link.

ILEC VoIP services are physically connected to the customer out of the same serving wire center that had been used for legacy circuit-switched services, but the VoIP switch – a computer “server” that supports the VoIP software – can in theory be located anywhere on the Internet. As


98. According to AT&T California's Form 477 submissions to the FCC, as of December 2019, approximately [REDACTED] of VoIP customers were being served via FTTP facilities. See Table 14.1 below.

99. “Verizon to End Rollout of FiOS,” *The Wall Street Journal*, March 30, 2010. <http://www.wsj.com/articles/SB10001424052702303410404575151773432729614> [accessed on July 16, 2015].

100. Frontier response to CD DR 15-F-6.

a result, a service interruption or outage can arise in the distribution infrastructure that connects the customer to the service wire center or anywhere beyond that point on the ILEC’s IP network.

From a maintenance perspective, the feeder/distribution link between the serving wire center and the customer’s premises is, as with legacy circuit-switched services, the location of most service outages. However, because VoIP requires locally-powered equipment located at the customer’s premises, failures in these devices can also result in service outages.

 ILEC VoIP services are provided out of the same serving wire center that had been used for legacy circuit-switched services, but the VoIP switch itself can be located anywhere on the Internet. A service interruption or outage can arise in the local distribution infrastructure or anywhere beyond that point on the ILEC's IP network.

VoIP service quality metrics: AT&T California

AT&T California began offering VoIP services in 2012. Demand for AT&T VoIP service peaked in 2015 and has been on the decline since then. As shown in Table 14.1 below, the overwhelming majority of AT&T VoIP service is being furnished over “copper” (DSL and FTTN) facilities; although the share of AT&T VoIP services that were being furnished over FTTP facilities has increased significantly, from █████ in 2012 to █████ in 2019:

Table 14.1

AT&T CALIFORNIA
VoIP SUBSCRIPTIONS AND TECHNOLOGIES
2012-2019

End of Year	Total	FTTP	Coaxial Cable	Fixed Wireless & Satellite	Copper	Other	Pct FTTP
2012	█████	█████	0	0	493,924	0	█████
2013	█████	█████	0	0	677,212	0	█████
2014	█████	█████	0	0	957,468	0	█████
2015	█████	█████	0	0	1,072,039	0	█████
2016	█████	█████	0	0	1,056,720	0	█████
2017	█████	█████	0	0	989,097	0	█████
2018	█████	█████	0	0	831,122	0	█████
2019	█████	█████	0	0	671,644	0	█████

Source: AT&T FCC Form 477 filings, AT&T California Response to CD Data Request 11-A-01.

FCC Form 477 also collects data on VoIP services being furnished over coaxial cable, fixed wireless & satellite, and “other.” AT&T California is not utilizing any of these technologies to provide its VoIP services.



Most AT&T California VoIP services are provided using DSL technology over a hybrid Fiber-to-the-Node (“FTTN”) / copper distribution architecture. However, AT&T’s deployment of Fiber-to-the-Premises (“FTTP”) has been increasing; by the end of 2019, some ██████ of all VoIP customers were being served via FTTP.

AT&T has provided us with approximately 3.3-million VoIP-related Trouble Report records for the 2012-2019 period. Table 14.2 below compares the total number of annual Trouble Reports with the “average” number of VoIP subscriptions during each year, calculated by taking the average of the December 31 VoIP subscription count for the current and prior years.

Year	EOY Subs	Average Subs for Year	Total Trouble Reports	Monthly TRs as Pct of Subs	Out-of-Service Trouble Reports	Monthly OOS TRs as Pct of Subs	OOS TRs as Pct of all TRs
2011	█						
2012	██████	██████	170,387	5.58%	109,189	3.57%	64.08%
2013	██████	██████	423,661	5.85%	282,685	3.90%	66.72%
2014	██████	██████	561,227	5.58%	346,958	3.45%	61.82%
2015	██████	██████	586,742	4.68%	316,543	2.52%	53.95%
2016	██████	██████	516,908	3.88%	310,023	2.33%	59.98%
2017	██████	██████	451,563	3.40%	296,370	2.23%	65.63%
2018	██████	██████	323,580	2.57%	215,073	1.71%	66.47%
2019	██████	██████	270,798	2.45%	185,504	1.68%	65.80%

Source: AT&T FCC Form 477 filings, AT&T California Response to CD Data Request 11-A-01.

Expressed in relative terms, there appears to have been a steady improvement in the percentage of VoIP subscriptions that experience trouble conditions in any given month, both in total as well as in the incidence of out-of-service conditions. However, the relative incidence of out-of-service reports as a percentage of all trouble reports has remained within the same 50%-69%) over the full 8-year period.



From 2012 through 2016, the percentage of AT&T California VoIP access lines that had experienced out-of-service conditions in any given month was decreasing steadily, but those gains were reversed after 2016.

We have also tracked the average duration of all trouble and out-of-service conditions, as measured from the date/time of the initial report to the date/time when the trouble or out-of-service conditions was fully cleared. As shown in Table 14.3 below, there was a small improvement in this metric through 2016, but over the last three years (2017-2019), durations of all trouble conditions as well as those involving service outages experienced a considerable spike, not unlike what had occurred for AT&T California’s legacy POTS services.

Year	Total Trouble Reports	Average Duration (Days)	Out-of-Service Trouble Reports	Average Duration (Days)
2012	170,387	1.27	109,189	1.22
2013	423,661	1.39	282,685	1.36
2014	561,227	1.33	346,958	1.26
2015	586,742	1.14	316,543	1.11
2016	516,908	1.19	310,023	1.17
2017	451,563	1.71	296,370	1.70
2018	323,580	2.24	215,073	2.21
2019	270,798	2.48	185,504	2.44

Source: AT&T FCC Form 477 filings, AT&T California Response to CD Data Request 11-A-01.



The average duration of all trouble and out-of-service conditions was also shrinking up until 2016, but both metrics saw large upward spikes, with outage durations increase from less than 30 hours prior to 2017 to around 50 hours from 2017 onward.

Service issues have many causes and, particularly with VoIP, many are driven by conditions largely or entirely outside of the carrier’s control. Unlike legacy POTS services where customer premises equipment (“CPE”) consists mainly of technologically simple analog telephone handsets, VoIP services require, among other things, a local source of electrical power including some form of battery back-up, either an “analog telephone adapter” (“ATA”) of some sort to convert between the analog microphone and earpiece signals associated with conventional

telephone handsets and the IP data stream that carries the VoIP signal as well as to translate touch tone signals into digital form, or one or more VoIP telephone handsets.¹⁰¹ If the VoIP service is physically provided in conjunction with the customer's broadband Internet access, a home router with an ethernet switch will also be needed. Such equipment is frequently provided (for a monthly rental fee) by the carrier, but some of it may also be provided by the customer, who must then assume responsibility for its installation and maintenance. Problems with any of the CPE can lead to service difficulties or outright interruptions. In many cases, when such situations arise, the carrier may provide technical support assistance to help the customer diagnose and correct the problem and restore service. Sometimes, all that is required is for the customer to briefly unplug and then reboot the router and/or modem. In many of these instances, however, when a customer reports a problem, a trouble ticket may nevertheless be created.

AT&T trouble report records include a "cause code" to identify the nature of the problem as determined by the carrier, AT&T has provided descriptions of approximately 190 cause codes,¹⁰² but some 300 unique cause codes are present in the 3.3-million VoIP trouble report records covering the 2012-2019 time frame. AT&T classifies the cause codes into six (6) broad "major" categories and about 40 subcategories. Table 14.4 below identifies the six categories and the total number of trouble reports in each category. Table 14.5 breaks this down for each year over the 2012-2019 period.

As shown in Table 14.4, some 58.4% of all trouble reports fall into categories 1-3, and are associated with distribution plant issues. Those falling into categories 1 and 2 are described as having been caused either by AT&T employees or by other non-AT&T personnel performing work on the distribution network. Category 3, which represents roughly 22% of all trouble reports, are associated with some type of network facility issue that arises from time to time but is not attributable to any specific activity being undertaken by the company. Less than one percent (category 4) are caused by weather, with another 2.5% (category 5) the result of various environmental conditions, including fires, animals and floods. Category 6 appears to be a sort of catch-all for other causes, the bulk of which (subcategories 62 and 65) appear to relate to customer premises issues, which likely include technical support with respect to the use of certain CPE components.

101. Unlike legacy circuit-switched services where several conventional analog handsets can be connected to the same access line and as individual "extensions" can be connected to the same phone call, only a single VoIP handset can be used with a typical residential VoIP service. As a result, most residential VoIP services are configured to utilize an Analog Telephone Adapter ("ATA") that is connected to the customer's existing inside (copper) wire for use with one or more conventional analog telephone handsets.

102. AT&T Response to CD DR 13-A-1.

Table 14.4					
AT&T CALIFORNIA					
PRINCIPAL VoIP TROUBLE REPORT CAUSE CATEGORIES AND SUBCATEGORIES					
2012-2019					
Cause Category	Subcategory	Category		Subcategory	
		Incidents	Pct of Total	Incidents	Pct of Total
1 AT&T COMPANY EMPLOYEE / SYSTEM	10			111,750	3.38%
	12			9,732	0.29%
	13			6,234	0.19%
	15			3,146	0.10%
				3,522	0.11%
	18			1,497	0.05%
			161,655	4.89%	25,647
2 NON-EMPLOYEE	20			393,862	11.92%
	21			3,673	0.11%
	22			6,119	0.19%
	29		1,041,899	31.54%	638,210
3 AT&T PLANT OR EQUIPMENT	30			692,573	20.96%
	31			10,910	0.33%
	32			14,580	0.44%
	33			32	0.00%
	34			11	0.00%
	39		723,869	21.91%	3,885
4 WEATHER	40			12,493	0.38%
	41			1,075	0.03%
	42			13,786	0.42%
	43			331	0.01%
	44			1,442	0.04%
	4			376	0.01%
	46			396	0.01%
	4		31,012	0.94%	1,113
5 MISCELLANEOUS / SERVICE ORDER ACTIVITY	50			2,528	0.08%
	51-53			14	0.00%
	54			132	0.00%
	55			19	0.00%
	56			10,708	0.32%
	57			16,317	0.49%
				1,798	0.05%
59		82,926	2.51%	7,493	0.23%
6 UNKNOWN / ROUTINE	60			43,363	1.31%
				554	0.02%
	62			697,984	21.13%
	63			55,275	1.67%
	64			97,405	2.95%
	65			1,971	0.06%
	66			24,322	0.74%
				98,061	2.97%
		1,262,153	38.20%	19,984	0.60%
				144,516	4.37%
UNCLASSIFIED		269	0.01%	7,882	0.24%
TOTALS		3,303,783	100.00%	3,303,783	100.00%

Source: AT&T Response to CD Data Requests 11-A-25; 13-A-1.



Some 58.4% of the 3.3-million AT&T California VoIP trouble reports created during the 2012-2019 period involved distribution plant issues.

Table 14.5

AT&T CALIFORNIA
ANNUAL VoIP TROUBLE REPORT INCIDENTS BY MAJOR CAUSE CATEGORIES
2012-2019

Category	2012	2013	2014	2015	2016	2017	2018	2019	Total
1 AT&T COMPANY EMPLOYEE / SYSTEM	8,545	22,162	29,661	25,052	20,112	21,240	16,763	18,120	161,655
2 NON-EMPLOYEE	68,236	166,965	214,988	156,449	125,411	131,165	100,991	77,694	1,041,899
3 AT&T PLANT OR EQUIPMENT	33,980	91,648	129,582	170,392	139,266	83,345	38,174	37,482	723,869
4 WEATHER	531	1,351	3,184	2,715	3,168	7,544	6,112	6,407	31,012
5 MISC / SERVICE ORDER ACTIVITY	2,018	5,311	10,309	20,727	15,715	13,458	7,618	7,770	82,926
6 UNKNOWN / ROUTINE	57,076	136,217	173,500	211,299	212,562	194,586	153,838	123,075	1,262,153
TOTALS	170,386	423,654	561,224	586,634	516,234	451,338	323,560	270,753	3,303,783

For legacy POTS services, GO 133-C/D utilizes a metric of “Trouble Reports per Hundred Access Lines per Month” (“TRPH”) to assess overall service quality performance. In Table 14.6 below, we calculate average monthly TRPH for each years 2012-2019 and separately for each major cause category:

Category	2012	2013	2014	2015	2016	2017	2018	2019
Average VoIP access lines	██████	██████	██████	██████	██████	██████	██████	██████
1 AT&T COMPANY EMPLOYEE / SYSTEM	0.2797	0.3059	0.2949	0.1998	0.1510	0.1598	0.1330	0.1641
2 NON-EMPLOYEE	2.2334	2.3048	2.1374	1.2477	0.9416	0.9869	0.8015	0.7036
3 AT&T PLANT OR EQUIPMENT	1.1122	1.2651	1.2883	1.3588	1.0457	0.6271	0.3030	0.3395
4 WEATHER	0.0174	0.0186	0.0317	0.0217	0.0238	0.0568	0.0485	0.0580
5 MISC / SERVICE ORDER ACTIVITY	0.0661	0.0733	0.1025	0.1653	0.1180	0.1013	0.0605	0.0704
6 UNKNOWN / ROUTINE	1.8682	1.8804	1.7249	1.6851	1.5960	1.4641	1.2209	1.1147
TOTAL TRPH	5.5769	5.8482	5.5796	4.6783	3.8761	3.3958	2.5678	2.4521
Note: Includes all Trouble Reports, Out-of-Service as well as non-OOS								

It is instructive to compare AT&T California's service quality performance for its legacy POTS and its VoIP services. Table 14.7 below provides the monthly weighted (by access lines in each wire center) average out-of-service TRPH over the Phase 2 2018-2019 study period separately for AT&T California legacy POTS and VoIP services. We have calculated the OOS TRPH for legacy services in several different ways:

- (1) The first calculation was based upon all 606 AT&T California wire centers for which both trouble report and access line data was available.
- (2) In the second approach, we limited the analysis to only the 530 wire centers where VoIP was being offered as of the end of 2019.
- (3) In the third calculation, we only looked at the 76 AT&T California wire centers where VoIP was *not* being offered as of the end of 2019.
- (4) In the fourth calculation, we have excluded the 27 wire centers where VoIP is offered but where no Trouble Report data for 2018 or 2019 was available.
- (5) The fifth calculation, which includes the same wire centers that were included in (4) and is thus a direct comparison, provides the weighted average out-of-service trouble reports per hundred VoIP access lines.

Calculation method	Number of Wire Centers	Out-of-Service Reports per Hundred Access Lines
1 Legacy POTS access lines – all wire centers for which data is available	606	1.2366
2 Legacy POTS access lines – wire centers where VoIP is offered	530	1.2213
3 Legacy POTS access lines – wire centers where VoIP is NOT offered	76	1.9964
4 Legacy POTS access lines – wire centers where VoIP Trouble Report data is available	503	1.2138
5 VoIP access lines	503	1.6842

This analysis provides several important findings. In the direct comparison of the 503 wire centers where both VoIP and POTS are offered and where trouble report data is available for both services (calculations (4) and (5) above), the VoIP OOS TRPH is actually 38.7% *greater* than for POTS. And when we compare calculations (2) and (3) above, we find that the incidence of POTS out-of-service conditions is 63.5% greater in the 76 wire centers where VoIP is *not* offered than in the 530 wire centers where it is. This result is, of course, consistent with our finding, as discussed in Chapter 4A above, that most all POTS service quality metrics are better in wire centers that have been equipped for broadband services than in those where no broadband upgrade investments have been made.



In wire centers where both VoIP and POTS are offered and where trouble report data is available for both services, the relative incidence of VoIP service outages was 38.7% greater than it was for POTS over the full Phase 1/2 study periods.

Individual wire center VoIP service quality performance

Table 14.8 provides average VoIP lines in service for each AT&T California wire center for each of the years 2014-2019, based upon AT&T FCC Form 477 submissions. Tables 14.9 and 14.10 provide Total and Out-of-Service VoIP TRPH for all AT&T wire centers where VoIP service is provided for the years 2015 through 2019.¹⁰³ This analysis included all cause codes,

103. AT&T provided us with its Form 477 VoIP access line data for end-of-year 2014 through 2019. Form 477 requires that carriers provide subscription counts by individual Census Block, rather than by wire center. With the assistance of the Geographic Information Systems (GIS) group in the Communications Division, we were able to associate each Census Block with a specific AT&T California wire center, and on that basis we were able to develop

even those where the outage was the result of customer activity or misuse of the service. As we explained earlier, VoIP services involve considerably more customer premises equipment than is needed for legacy POTS-type services. We do not believe it would be correct to exclude sources of service problems merely because they are located at the customer's premises.

The AT&T VoIP TRPH calculations shown in Tables 14.9 and 14.10 appear to fall well short of the GO 133-C/D threshold. Certain wire centers appear to exhibit particularly high TRPH numbers, but these seem to be due primarily to the nature of the underlying data upon which this analysis was based rather than to systemic issues in those locations. That said, the spike in overall trouble reports and in service outages that appears to have occurred starting in 2017 does raise some concerns, and it may be worthwhile for the Commission to pursue this further as the importance of VoIP as the preferred method of providing basic service grows in future years.

wire center level VoIP subscriptions as of the end of each year from 2014 through 2019. In order to calculate TRPH based only upon annual data, we needed to calculate the average number of lines in service over the full year, which required that we start our analysis with 2015, using the average of end-of-year 2014 and 2015.

Table 14.8

AT&T CALIFORNIA
VoIP ACCESS LINES IN SERVICE BY WIRE CENTER
AVERAGE PER MONTH
2014-2019

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
661410	ACTNCA11	Acton						
661351	AGDLCA11	Agua Dulce						
818600	AGORCA11	Agoura						
510001	ALBYCA11	Albany/Solano						
530425	ALGHCA11							
626601	ALHBCA01	Alhambra						
510002	ALMDCA11	Alameda/Central						
619700	ALPICA12	Alpine						
209150	ANCMCA01	Angels Camp						
707275	ANGWCA11	Angwin						
714701	ANHMCA01	Anaheim Lemon						
714702	ANHMCA11	Anaheim Cypress						
714703	ANHMCA12	Anaheim La Palma						
714811	ANHMCA17	ANHM Hills						
925003	ANTCCA11	Antioch						
831100	APTSCA12	Aptos						
626602	ARCDCA11	Arcadia						
707276	ARCTCA11	Arcata						
805352	ARGRCA12	Arroyo Grande						
831144	ARMSCA11	Aromas						
209151	ARNLCA11	Arnold						
530427	ARSNCA11	Anderson						
951704	ARTNCA11	Arlington						
661353	ARVNCA11	Arvin						
559152	ASMTCA11							
805354	ATSCCA11	Atascadero						
209153	ATWRCA12	Atwater						
530428	AUBNCA01	Auburn - Main						
530429	AUBNCA11	Auburn - Placer Hills						
559154	AVNLCA12	Avenal						
949706	BALBCA01	Balboa						
530434	BCWYCA11	Brockway						
530431	BEALCA11	Beale						
323604	BELLCA11	Bell						
530432	BGGSCA11	Biggs						
707281	BGVLCA11							
661356	BKFDCA11	Bakersfield Empire						
661357	BKFDCA12	Bakersfield Main / Fairview						
661358	BKFDCA13	Bakersfield Columbus						
661359	BKFDCA14	Bakersfield Temple						
661360	BKFDCA15	Bakersfield Mettler						
661361	BKFDCA17	Bakersfield West / Rosedale						
661409	BKFDCA19	Bakersfield Nomad						
510004	BKLYCA01	Berkeley/Bancroft						
831102	BLCKCA11	Boulder Creek						
707277	BNCICA11	Benicia						
831103	BNLMCA11	Ben Lomond						
714710	BNPKCA11	Buena Park						
707280	BNVLCA11	Boonville						
818605	BRBNCA11	Burbank Palm						
818606	BRBNCA13	Burbank Thornton						
#N/A	BRDLCA91							
714709	BREACA12	Brea						
650006	BRLNCA01	Burlingame						
760707	BRSPCA11							
925007	BRWDCA12	Brentwood						
760708	BRWLCA11	Brawley						
925082	BSRNCA70	Bishop Ranch						
530435	BTCYCA11							
925008	BTISCA11	Bethel Island						
559242	BURLCA11	Burrell						
310607	BVHLCA01	Beverly Hills						
209155	BVLYCA11	Bear Valley						
805362	BYPKCA11	Baywood Park						
707285	CBMTCA11	Cobb Mountain						
530438	CHICCA01	Chico Main						
530437	CHLNCA11							

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
619718	CHVSCA11	Chula Vista Third Avenue						
619719	CHVSCA12	Chula Vista Apache						
559158	CHWCCA11	Chowchilla						
818666	CLBSCA11	Calabasas / Park Sorrento						
818665	CLBSCA50	Calabasas / Los Virgenes						
310608	CLCYCA11	Culver City						
559160	CLNGCA01	Coalinga						
707283	CLOKCA11	Clear Lake Oaks						
707282	CLSTCA11	Calistoga						
559159	CLVSCA11	Clovis						
760712	CLXCCA12	Calexico						
805364	CMBACA11	Cambria						
559156	CMNLCA11							
760714	CMPDCA01	Camp Pendleton						
310609	CMTNCA01	Compton						
925009	CNCRCA01	Concord						
818610	CNPKCA01	Canoga Park						
530528	CNVYCA11	Central Valley						
707284	CODLCA11	Cloverdale						
650010	COLACA01	Colma-Daly City						
707286	CORDCA12	Cordelia						
951721	CORNCA11	Corona						
909720	COTNCA11	Colton						
510011	CRCTCA02	Crockett						
949722	CRDMCA11	Corona Del Mar						
760716	CRLSCA11	Carlsbad Harding						
760717	CRLSCA12	Carlsbad La Costa						
831105	CRMLCA11	Carmel Main						
619723	CRNDCA11	Coronado						
530440	CRNGCA12	Corning						
559157	CRTHCA11	Caruthers						
831106	CRVYCA11	Carmel Valley						
949725	CSMSCA11	Costa Mesa						
661408	CSTCCA11	Castaic						
831107	CSVLCA11	Castroville						
707287	CTTICA12	Cotati						
209161	CTVLCA11							
530441	CTWDCA11	Cottonwood						
209162	CWLDCA12	Crows Landing						
805366	CYCSCA11	Cayucos						
925081	CYTNCA11	Clayton						
925012	DAVLCA12	Danville-Main (12)						
925085	DAVLCA13	Danville - Tassajara (13)						
530442	DAVSCA11	Davis						
661367	DELNCA11	Delano						
559164	DINBCA01	Dinuba						
707443	DIXNCA11	Dixon						
858727	DLMRCA12	Del Mar						
559163	DLRYCA11	Del Rey						
619728	DLZRCA11	Dulzura						
530445	DNGNCA12	Dunnigan						
530446	DNSMCA11	Dunsmuir						
661369	EDWRCA01	Edwards						
530448	EKCKCA11							
619729	ELCJCA11	El Cajon						
760730	ELCNCA01	El Centro						
626611	ELMNCA01	El Monte						
510013	ELSBCA11	Rich-Appian Way/El Sobrante						
310613	ELSGCA12	El Segundo Douglas						
949731	ELTRCA11	El Toro						
760732	ENCTCA12	Encinitas						
661368	ERLMCA11	Earlimart						
209192	ESCLCA11	Escalon						
760733	ESCNCA01	Escondido						
530450	ESPRCA11	Esparto						
707289	EURKCA01	Eureka						
831108	FETNCA11	Felton						
760735	FLBKCA12	Fallbrook						
805370	FLMRCA11	Fillmore						
916453	FLSMCA12	Folsom - Nimbus						
916454	FLSMCA13	Folsom - El Dorado Hills						
916536	FLSMCA14	Folsom - Blue Ravine						
909736	FNTACA11	Fontana						
559166	FRBHCA11	Firebaugh						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
760738	FRCKA11							
707290	FRFDCA01	Fairfield						
530455	FRGLCA11							
510014	FRMTCA11	Fremont Main 11						
510015	FRMTCA12	Fremont Adams (Oliver12)						
916451	FROKCA11	Fair Oaks						
559168	FRSNCA01	Fresno Main						
559169	FRSNCA11	Fresno Baldwin						
559172	FRSNCA12	Fresno Clinton						
559170	FRSNCA13	Fresno Sierra						
559245	FRSNCA14	Fresno West / Highway City						
559247	FRSNCA15	Fresno Woodward						
559165	FRVLCA11	Farmersville						
707291	FSVLCA11	Forestville						
707292	FTBRCA02	Fort Bragg						
707293	FTUNCA11	Fortuna						
714737	FUTNCA01	Fullerton						
209171	GALTCA11	Galt						
818614	GLDLCA11	Glendale						
831109	GNFDC11	Green Field						
831110	GNZLCA11	Gonzales						
530461	GRDLCA11	Gridley						
310615	GRDNCA01	Gardena						
714739	GRGVCA01	Euclid						
530457	GRTWCA11	Georgetown						
530459	GRVYCA01	Grass Valley						
530532	GRVYCA11	Lake of the Pine						
530535	GRVYCA12	Wildwood						
209174	GUSTCA11	Gustine						
707296	GUVLCA11	Guerneville						
707294	GYVLCA11	Geyersville						
209176	HERLCA11	Herald						
909741	HGLDCA11	Highland						
209177	HGSNCA11	Hughson						
707297	HLBGCA11	Healdsburg						
831111	HLSTCA11	Hollister						
760742	HLVLCA11	Holtville						
323616	HLWDCA01	Hollywood						
650016	HMBACA12	Half Moon Bay						
530462	HMCYCA11	Hamilton City						
530463	HMWDCA11	Homewood						
559175	HNFRCA01	Hanford						
323617	HNPKCA01	Huntington Park						
510080	HRCLCA11	Hercules-Pinole						
559178	HURNCA11	Huron						
310618	HWTHCA01	Hawthorne						
510017	HYWRCA01	Hayward Main						
510018	HYWRCA11	Hayward Depot						
415019	IGNCCA12	Ignacio						
310619	IGWDCA01	Inglewood						
619744	IMBHCA11	Imperial Beach						
760743	IMPRCA11	Imperial						
415020	INVRCA11	Inverness						
209179	IONECA11	Ione						
949745	IRVNCA01	Irvine						
949807	IRVNCA11	Irvine/Airport						
949810	IRVNCA12	Spectrum-Irvine						
559180	IVNHCA11	Ivanhoe						
619851	JAMLCA60	Jamul						
209181	JCSNCA01	Jackson						
209182	JMTWCA11	Jamestown						
760748	JULNCA12	Julian						
559183	KGBGCA11	Kingsburg						
831112	KGCYCA11	King City						
209184	KNFYCA11							
530465	KYBRCA11	Kyburz						
818621	LACRCA11	La Crescenta						
858750	LAJLCA11	La Jolla / Girard						
619752	LAMSCA01	La Mesa						
661372	LAMTCA11	Lamont						
209190	LCFRCA11	Lockeford						
661373	LEBCCA11	Lebec						
559188	LEMRC11	Lemore Main						
559189	LEMRC12	Lemore Wyman						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
925022	LFYTC A11	Lafayette						
949749	LNGCA12	Laguna Niguel						
209187	LGRDCA11	Le Grande						
209185	LGRNCA12	LaGrande/D Pedro						
707301	LKBRCA11							
661405	LKLACA11	Lake Los Angeles						
707302	LKPTCA02	Lakeport						
619751	LKSDCA12	Lakeside						
530471	LLTNCA11							
916467	LNCLCA11	Lincoln						
661374	LNVCYA11	Leona Valley						
209191	LODICA01	Lodi						
707303	LOLTCA11	Lolita						
916470	LOMSCA11	Loomis						
310622	LOMTCA11	Lomita						
415023	LRKSCA11	Larkspur/Corte Madera						
213624	LSANCA02	Madison 02 / MO						
213625	LSANCA03	Madison 03 / MA						
323626	LSANCA05	LSAN Pleasant						
213627	LSANCA06	Union						
310628	LSANCA07	LSAN Airport						
323629	LSANCA08	LSAN Melrose						
213630	LSANCA09	Richmond						
323631	LSANCA10	LSAN Webster						
213632	LSANCA11	Rampart						
323633	LSANCA12	Normandy						
323634	LSANCA13	LSAN Plymouth						
323635	LSANCA14	LSAN Adams						
323636	LSANCA15	LSAN Axminster						
323638	LSANCA23	LSAN Capitol						
323640	LSANCA29	LSAN Sunset						
323641	LSANCA34	LSAN Angeles						
323642	LSANCA35	LSAN Montebello						
323643	LSANCA38	LSAN Republic						
323644	LSANCA56	LSAN Clinton						
650024	LSATCA11	Los Altos						
209193	LSBNCA12	Los Banos						
530469	LSMLCA11	Los Molinos						
661375	LTRKCA11	Little Rock						
925025	LVMRCA11	Livermore						
530468	LVOKCA11	Live Oak						
707304	LWLKCA11	Lower Lake						
559194	MADRCA11	Madera Main						
559243	MADRCA12	Madera Bonnadelli						
831113	MARNCA11	Marina						
209199	MDSTCA02	Modesto Main						
209200	MDSTCA03	Modesto Kellog / South / Ceres						
209201	MDSTCA04	Modesto Kingswood / Curtis / Salida						
209248	MDSTCA05	Modesto Tally						
707306	MDTWCA11	Middletown						
209202	MKHLCA12							
707307	MKVLCA11	McKinleyville						
650026	MLBRCA11	Millbrae						
408114	MLPSCA11	Milpitas						
415027	MLVYCA01	Mill Valley						
707305	MNDCCA11	Mendocino						
559195	MNDTCA11	Mendota						
650028	MNPKCA11	Menlo Park						
661376	MOJVCA01	Mojave						
925029	MORGCA12	Moraga						
805378	MRBACA11	Morro Bay						
209196	MRCDA01	Merced						
530473	MRDNCA11							
209203	MRPHCA11	Murphys						
805377	MRPKCA12	Moorpark						
925030	MRTZCA11	Martinez						
650031	MSBHCA11	Moss Beach						
949806	MSVJCAAT	Mission Viejo						
530529	MTAGCA11	Montague						
831115	MTRYCA01	Monterey						
530474	MTSHCA12	Mount Shasta						
650032	MTVWCA11	Mountain View						
530472	MYVICA01	Marysville						
707310	NAPACA01	Napa						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
530477	NCLSCA12	Nicolaus						
916478	NHLDCA11	Edgewood/N. Highl						
661379	NHLLCA01	Newhall						
818646	NHWDCA01	NHWD / Lankershim						
818647	NHWDCA02	NHWD / Magnolia						
707311	NICECA11	Nice						
415033	NICSCA11							
760855	NILDCA11	Niland Main						
760856	NILDCA12							
805380	NIPMCA11	Nipomo						
818648	NORGCA11	Northridge						
916479	NSCRCA11	Wabash						
916537	NSCRCA12	North Natomas						
530480	NSJNCA11	North San Juan						
619754	NTCYCA11	National City - Highland						
530475	NVCYCA11	Nevada City						
916476	NWCSCA11	Newcastle						
209204	NWMNCA12	Newman						
530481	NYUBCA11							
707312	OCDNCA11							
760758	OCSOCA11	Oceanside / Mission						
805382	OJAICA11	Ojai						
209205	OKDLCA11	Oakdale						
510036	OKLDCA03	Oakland Franklin						
510037	OKLDCA04	Oakland Kellog(Fruitvale)						
510038	OKLDCA11	Oakland 45th/Olympic(Central)						
510039	OKLDCA12	Oakland Holly						
510040	OKLDCA13	Oakland Mountain						
925041	OKLYCA11	Oakley						
805381	OKVWCA11	Oakview						
661383	OLDLCA11	Export / Oildale						
559206	ORCVCA11	Orange Cove						
530483	ORLDCA11	Orland						
925042	ORNDCA11	Orinda						
714759	ORNGCA11	Orange Chapman						
714760	ORNGCA13	Orange Olive						
714761	ORNGCA14	Orange West						
559207	ORSICA11	Orosi						
916482	ORVACA11	Orangevale						
530484	ORVLA11	Oroville Main						
530485	ORVLA12	Oroville East						
619853	OTMSCA11	Otay Mesa						
760764	PALACA11	Pauma Valley						
858762	PCBHCA01	Garnet						
858763	PCBHCA11	Hornblend						
650043	PCFCCA11	Pacifica						
951765	PDLYCA11	Pedley						
805386	PIRUCA11	Piru						
650045	PLALCA02	Palo Alto Main						
650046	PLALCA12	Palo Alto South						
714767	PLCNCA11	Placentia						
661384	PLDLCA01	Palmdale						
661412	PLDLCA11	Palmdale East / 47TH ST						
209212	PLMOCA11	Plymouth						
925047	PLTNCA12	Pleasanton Main/Hopyard						
925083	PLTNCA13	Pleasanton Hacienda						
530489	PLVLCA11	Placerville - Main						
530490	PLVLCA12	Placerville - Niagara						
619766	PNVYCA11	Pine Valley						
858768	POWYCA11	Poway Midland						
530486	PRDSCA11	Paradise Main						
530487	PRDSCA12	Paradise Pines						
559208	PRLRCA11	Parlier						
562649	PRMTCA01	Paramount						
925049	PSBGCA01	Pittsburg Main						
925050	PSBGCA11	Pittsburg Bay Point / Willow						
805387	PSBHCA11	Pismo Beach						
650051	PSCDCA11	Pescadero						
626650	PSDNCA11	Pasadena / Mt Wilson / Green						
626651	PSDNCA12	Pasadena / Lake						
805385	PSRBCA01	Paso Robles						
707314	PTLMCA01	Petaluma						
530492	PTOLCA01							
559213	PTVLCA11	Porterville						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
707316	PTVYCA11							
559210	PXLYCA11	Pixley						
530493	QNCYCA12							
760769	RAMNCA11	Ramona						
858770	RBRNCA11	Rancho Bernardo						
916541	RCKLCA01	Stanford Ranch						
916527	RCKLCA11	Rocklin						
510052	RCMDCA11	Richmond-SF						
530494	RDBLCA01	Red Bluff						
650053	RDCYCA01	Redwood City						
530495	RDNGCA02	Redding Main						
530531	RDNGCA11	Redding Enterpr						
818652	RESDCA01	Reseda						
707317	RIDECA11	Rio Dell						
916526	RILNCA12	Rio Linda						
909773	RILTCA11	Rialto						
858854	RNPSCA11	Rancho Penasquitos						
619852	RNSDCA11	Rancho San Diego						
626654	ROSMCA11	Rosemead						
858771	RSFECA12	Rancho Santa Fe						
661388	RSMDCA11	Rosamond						
949808	RSMGCA11	R. S. Margarita						
707337	RTPKCA11	Rohnert Park						
559215	RVDLCA11	Riverdale						
209214	RVRBCA11	Riverbank						
951774	RVSDCA01	Riverside Orange						
951775	RVSDCA11	Woodcrest						
661407	SAGSCA11	Saugus						
619795	SANTCA01	Santee						
805391	SATCCA12	Saticoy						
707321	SBSTCA11	Sebastapol						
916497	SCRMA01	Sacramento Mn						
916498	SCRMA02	SCRMA - Ivanhoe						
916499	SCRMA03	SCRMA - Garden						
916500	SCRMA11	SCRMA - Gladstone						
916501	SCRMA12	SCRMA - Empire						
916502	SCRMA13	SCRMA - Fruitridge						
831116	SCVYCA01	Scotts Valley						
530508	SDSPCA11	Soda Springs						
559217	SELMCA11	Selma						
831117	SESDCA11	Seaside						
323655	SGATCA01	South Gate						
530504	SGSPCA11	Shingle Springs						
661392	SHFTCA11	Shafter						
530503	SHLKCA01	Shasta Lake						
818656	SHOKCA01	Sherman Oaks						
805393	SIMICA11	Simi						
949791	SJCPCA12	S. J. Capistrano						
209220	SKTNCA01	Stockton Main						
209221	SKTNCA11	Stockton Granite						
209222	SKTNCA12	Stockton Ashley						
209223	SKTNCA14	Stockton Redwood						
831118	SLDDCA11	Soledad						
661394	SLMNCA11	Solemint						
831119	SLNSCA01	Salinas Main						
831120	SLNSCA11	Hickory/Salinas						
831121	SLNSCA12	Glenview						
831122	SLNSCA13	Hunter						
831123	SLNSCA14	Moro						
714797	SLVRCA11	Silverado						
530507	SMAVCA11	Smartsville						
714788	SNANCA01	Bush						
714789	SNANCA11	Bristol						
714804	SNANCA12	Santa Ana West / SNAN Bolsa						
650055	SNBUCA02	San Bruno						
949776	SNCLCA12	San Clemente						
650056	SNCRCA11	San Carlos						
831125	SNCZCA01	Santa Cruz						
831126	SNCZCA11	Santa Cruz-Capitola						
619777	SNDGCA01	SNDG C Street						
619778	SNDGCA02	SNDG University						
858779	SNDGCA03	SNDG Linda Vista						
619780	SNDGCA05	SNDG Saipan						
619781	SNDGCA06	SNDG 37th Street						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
619782	SNDGCA11	SNDG College						
619783	SNDGCA12	SNDG Market Street						
619784	SNDGCA14	SNDG Tennyson						
858785	SNDGCA15	SNDG Regents						
858786	SNDGCA16	SNDG Mira Mesa						
415058	SNFCCA01	SF Bush Pine						
415059	SNFCCA04	SF Market-McCoppin						
415060	SNFCCA05	SF Mission-25th St						
415061	SNFCCA06	SF Juniper-Onondaga						
415067	SNFCCA12	SF Larkin-Steiner						
415064	SNFCCA13	SF Evergreen-9th Ave						
415065	SNFCCA14	SF Montrose-19th						
415066	SNFCCA17	SF Third St.						
415068	SNFCCA21	SF Folsom						
415084	SNFCCA64							
626658	SNGBCA01	San Gabriel						
831127	SNJNCA11	San Juan Baustista						
408128	SNJSCA02	San Jose Main						
408129	SNJSCA11	San Jose White Rd						
408130	SNJSCA12	San Jose Dial Way						
408131	SNJSCA13	San Jose Chynoweth						
408132	SNJSCA14	San Jose Foxworthy						
408133	SNJSCA15	San Jose Evergreen / San Felipe						
408134	SNJSCA18	San Jose Almaden Valley						
#N/A	SNJSCA20							
408145	SNJSCA21	San Jose Junction						
510070	SNLACA11	San Leandro						
805389	SNLOCA01	San Luis Obispo						
408136	SNMACA11	San Martin						
#N/A	SNMCCA11							
805390	SNMICA11							
650071	SNMTCA11	San Mateo						
310659	SNPDCA01	San Pedro						
209218	SNRACA13	Sonora						
415072	SNRFCA01	San Rafael Main						
415073	SNRFCA11	Parkway						
925074	SNRMCA11	San Ramon						
707320	SNRSCA01	Santa Rosa Main						
707319	SNRSCA11	Los Alamos						
408143	SNTCCA01	Santa Clara Spacepark						
408137	SNTCCA11	Santa Clara Bellomy						
408138	SNVACA01	Carrol / Sunnyvale						
408139	SNVACA11	Mathilda / Sunneyvale						
619794	SNYSCA12	San Ysidro						
707323	SONMCA12	Sonoma						
626660	SPSDCA11	Sout Pasadena / Mission						
415075	SSLTCA11	Sausalito Larkspur						
530509	STAHCA01	South Tahoe - Sussex						
530511	STAHCA12	South Tahoe - Tamarack						
530512	STAHCA13	South Tahoe - Meyers/Apache						
415076	STBHCA11	Stinson Beach						
209225	STCKCA11	Sutter Creek						
707318	STHNCA11	St. Helena						
707324	SUISCA11	Suisun City						
415005	TBRNCA11	Tiburon						
661395	THCHCA01	Techachapi						
530514	THCYCA01	Tahoe City						
209227	THTNCA11	Thornton						
805396	TMTNCA11	Templeton						
559229	TPTNCA11	Tipton						
209230	TRACCA11	Tracy						
209232	TRLCCA11	Turlock						
310661	TRNCCA11	Torrance						
707326	TRNDCA11							
530515	TRUCCA11	Truckee						
559231	TULRCA11	Tulare						
714798	TUSTCA11	Tustin 11						
209233	TWHRCA11	Twain Harte						
707328	UKIHCA01	Ukiah Main						
707327	UKIHCA12	Capella/Ivanhoe						
510078	UNCYCA11	Union City						
707329	UPLKCA11	Upper Lake						
707330	VCVLCA12	Vacaville						
559235	VISLCA11	Visalia Main						

WC	CLLI	WC Name	2014	2015	2016	2017	2018	2019
760800	VISTCA12	Vista						
760799	VLCTCA11	Valley Center						
707331	VLLJCA01	Vallejo						
818662	VNNYCA02	Van Nuys						
805400	VNTRCA02	Ventura / Fir						
805399	VNTRCA11	Ventura Main / Montalvo						
209234	VYSPCA11	Valley Springs						
209238	WANACA11	Wawana						
661402	WASCCA01	Wasco						
530523	WDLCA11	Woodland						
559239	WDLKCA11	Woodlake						
530518	WEEDCA01	Weed						
707333	WEOTCA11	Weott						
310663	WLANCA01	Century City						
661401	WLBSCA11							
209236	WLLCCA11	Wallace						
310664	WLMGCA01	Wilmington						
707334	WLTSCA12	Willits						
530521	WLWSCA11	Willows						
925079	WNCKCA11	Walnut Creek						
707335	WNDSCA11	Windsor						
760801	WNSPCA12							
530522	WNTRCA11	Winters						
916519	WSCRCA11	Frontier						
209237	WTFRCA11	Waterford						
530520	WTLCA12	Wheatland						
831141	WTVLCA01	Watsonville						
530525	YBCYCA01	Yuba City / Marysville						
707336	YNVLCA11	Yountville						
530524	YREKCA11	Yreka						
714802	YRLNCA11	Yorba Linda						
714809	YRLNCA12	Gypsum Canyon						
209240	YSMTCA11	Yosemite Main						
209241	YSMTCA12	El Portal						
TOTALS								

Table 14.9

AT&T CALIFORNIA
VoIP TROUBLE REPORTS PER HUNDRED ACCESS LINES (TRPH) BY WIRE CENTER
AVERAGE PER MONTH
2015-2019

WC	CLLI	WC Name	2015	2016	2017	2018	2019
661410	ACTNCA11	Acton	13.1410	13.3903	11.3695	10.6481	13.1373
818600	AGORCA11	Agoura	6.1432	4.6244	3.4294	2.9803	2.9544
661351	AGDLCA11	Agua Dulce	2.9116	2.8571	1.8152	1.5683	1.4069
510002	ALMDCA11	Alameda/Central	4.4552	3.6312	3.0032	2.0746	1.8401
510001	ALBYCA11	Albany/Solano	5.3508	4.8163	3.9750	2.6746	2.2536
626601	ALHBCA01	Alhambra	4.4423	3.5220	3.0113	2.3470	2.0678
619700	ALPICA12	Alpine	6.2809	5.5102	3.5118	2.8990	2.9086
714702	ANHMCA11	Anaheim Cypress	5.0254	4.0505	3.6670	2.8607	2.5691
714703	ANHMCA12	Anaheim La Palma	5.1267	4.5279	4.3975	3.3232	4.7181
714701	ANHMCA01	Anaheim Lemon	3.3106	2.7617	2.7833	2.0488	1.9138
530427	ARSNCA11	Anderson	4.5971	3.8249	3.1020	2.2648	3.0063
209150	ANCMCA01	Angels Camp	7.8829	5.2503	3.2114	2.3951	2.1667
707275	ANGWCA11	Angwin	5.0265	4.3371	2.8837	2.1497	2.1620
714811	ANHMCA17	ANHM Hills	4.7684	4.1641	3.1073	2.0213	2.3136
925003	ANTCCA11	Antioch	4.2318	3.2844	2.7425	2.0799	2.0108
831100	APTSKA12	Aptos	6.6288	5.0807	3.8355	2.8478	2.5473
626602	ARCDCA11	Arcadia	3.6009	3.0111	2.2678	1.8557	1.5665
707276	ARCTCA11	Arcata	2.2088	2.6738	2.2634	2.2828	2.0110
951704	ARTNCA11	Arlington	4.1430	3.3540	3.1865	2.3941	2.2122
209151	ARNLCA11	Arnold	15.4167	4.6816	3.5036	1.7121	2.5556
831144	ARMSCA11	Aromas	10.2778	7.3757	4.9371	5.0554	2.8067
805352	ARGRCA12	Arroyo Grande	3.3880	3.4496	2.6958	2.0434	2.1774
661353	ARVNCA11	Arvin	9.4578	7.8231	5.5668	3.9277	4.2693
805354	ATSCCA11	Atascadero	4.1667	3.9585	3.5737	2.4199	3.1123
209153	ATWRCA12	Atwater	4.9495	4.8330	3.9427	2.6285	2.7652
530428	AUBNCA01	Auburn - Main	3.8703	3.3563	2.6059	2.2148	2.0989
530429	AUBNCA11	Auburn - Placer Hills	6.1014	5.5753	4.8209	2.7574	3.7492
559154	AVNLCA12	Avenal	4.6454	4.6711	3.5616	2.8388	2.6851
661361	BKFDC17	Bakersfield West / Rosedale	4.4272	6.1828	5.4077	2.0368	1.8961
661358	BKFDC13	Bakersfield Columbus	5.7173	4.1641	4.0260	3.7489	3.1580
661356	BKFDC11	Bakersfield Empire	2.1906	3.2145	3.0939	1.1758	0.9654
661357	BKFDC12	Bakersfield Main / Fairview	5.0935	3.7596	4.0309	3.2547	3.0449
661360	BKFDC15	Bakersfield Mettler	-	-	0.0030	-	-
661409	BKFDC19	Bakersfield Nomad	5.8830	2.5370	2.2067	3.2338	2.5788
661359	BKFDC14	Bakersfield Temple	5.2693	5.5252	5.6153	3.0140	2.9570
949706	BALBCA01	Balboa	5.7662	4.8432	3.2667	2.6588	2.3156
805362	BYPKCA11	Baywood Park	5.3937	11.9266	7.6789	3.9007	3.3737
530431	BEALCA11	Beale	4.4218	2.8369	7.5000	1.1905	1.3889
209155	BVLYCA11	Bear Valley	8.7719	0.2692	0.1831	2.9052	2.0521
323604	BELLCA11	Bell	3.8551	3.7124	2.9985	2.3113	1.8918
831103	BNLMCA11	Ben Lomond	4.0776	1.0010	0.8855	1.7131	1.4295
707277	BNCICA11	Benicia	6.9387	10.9203	8.3129	3.4319	3.0600
510004	BKLYCA01	Berkeley/Bancroft	3.6275	3.5572	2.9882	1.9523	2.1633
925008	BTISCA11	Bethel Island	1.6726	4.3112	3.3055	1.4930	1.4765
310607	BVHLCA01	Beverly Hills	4.6368	7.3807	5.5904	2.3785	1.9450
530432	BGGSCA11	Biggs	8.3924	12.7148	8.3333	3.8549	4.0754
925082	BSRNCA70	Bishop Ranch	0.9703	1.2271	0.7772	0.6620	0.7062
831102	BLCKCA11	Boulder Creek	8.6283	0.5175	0.4825	3.3037	3.4973
760708	BRWLCA11	Brawley	4.2393	1.9927	1.4766	2.2763	1.8817
714709	BREACA12	Brea	5.5485	6.0046	5.7403	3.6778	3.4867
925007	BRWDCA12	Brentwood	8.9539	16.1826	9.9329	3.6859	3.7269
714789	SNANCA11	Bristol	4.7098	4.1077	4.3497	2.8136	2.6428
530434	BCWYCA11	Brockway	11.9205	3.4435	2.2152	2.2388	2.0784
714710	BNPKCA11	Buena Park	5.5511	8.1527	7.7134	3.1712	2.8302
818605	BRBNCA11	Burbank Palm	5.5101	5.7341	5.0765	3.1469	2.8581
818606	BRBNCA13	Burbank Thornton	0.4033	0.1650	0.0990	0.1888	0.2983
650006	BRLNCA01	Burlingame	5.3289	5.3619	4.1916	2.4357	2.5533
559242	BURLCA11	Burrell	1.9048	0.2387	0.1710	0.4154	0.3121
714788	SNANCA01	Bush	3.7292	5.4822	6.3299	2.5084	2.1825

WC	CLLI	WC Name	2015	2016	2017	2018	2019
818665	CLBSCA50	Calabasas / Los Virgenes	2.3126	1.6254	1.2370	1.3596	1.3008
818666	CLBSCA11	Calabasas / Park Sorrento	5.1891	6.8003	5.1459	3.1756	3.8983
760712	CLXCCA12	Calexico	6.2968	0.9028	0.6711	3.6895	2.5652
707282	CLSTCA11	Calistoga	5.1020	9.1747	6.9967	3.8069	3.8481
805364	CMBACA11	Cambria	4.1752	2.1959	1.5164	1.6949	1.9577
760714	CMPDCA01	Camp Pendleton	0.8349	0.4630	0.3169	0.2347	0.1098
818610	CNPKCA01	Canoga Park	5.3801	5.4063	5.0975	3.0111	2.8615
707327	UKIHCA12	Capella/Ivanhoe	91.1111	1.9037	1.2263	51.2821	39.5833
760716	CRLSCA11	Carlsbad Harding	7.0274	8.0700	8.2577	4.7094	4.2639
760717	CRLSCA12	Carlsbad La Costa	6.9698	6.6477	5.6303	3.9869	3.5323
831105	CRMLCA11	Carmel Main	11.7135	3.9028	3.2130	3.2835	4.0843
831106	CRVYCA11	Carmel Valley	5.0207	3.9048	3.2133	2.4727	2.0256
408138	SNVACA01	Carrol / Sunnyvale	4.0095	3.3977	2.6505	2.0464	2.1062
559157	CRTHCA11	Caruthers	8.3714	2.7541	3.0810	3.4326	3.2609
661408	CSTCCA11	Castaic	4.3861	3.1894	2.5418	2.0351	1.9770
831107	CSVLCA11	Castroville	4.1063	1.0003	0.8518	2.3381	1.8195
805366	CYCSCA11	Cayucos	4.0830	8.7097	5.0633	2.0050	1.9102
530528	CNVYCA11	Central Valley	4.4281	0.3529	0.2409	2.2569	4.3583
310663	WLANCA01	Century City	9.3962	19.1024	13.6816	5.3705	4.7619
530438	CHICCA01	Chico Main	4.3018	6.2888	5.8209	2.4510	2.5987
559158	CHWCCA11	Chowchilla	4.7686	0.6118	0.4859	2.9922	2.1902
619719	CHVSCA12	Chula Vista Apache	4.4391	4.4041	4.3647	2.7180	2.3512
619718	CHVSCA11	Chula Vista Third Avenue	4.5787	7.0764	8.6739	2.9300	2.6250
925081	CYTNCA11	Clayton	5.2840	8.0985	6.2171	3.0677	2.9052
707283	CLOKCA11	Clear Lake Oaks	9.2593	1.1696	1.0862	3.8871	3.1179
707284	CODLCA11	Cloverdale	4.5151	3.4301	3.1136	2.9544	2.9073
559159	CLVSCA11	Clovis	4.0140	5.8812	5.3590	2.1237	1.9916
559160	CLNGCA01	Coalinga	4.9003	1.4673	1.2754	3.1447	2.1419
707285	CBMTCA11	Cobb Mountain	-	-	1.1411	2.0440	3.8667
650010	COLACA01	Colma-Daly City	5.1277	7.1876	6.3224	2.4791	2.6158
909720	COTNCA11	Colton	4.1748	1.2395	1.1020	2.3602	2.0323
310609	CMTNCA01	Compton	5.9767	9.9764	8.3569	3.1558	3.5772
925009	CNCRCA01	Concord	4.7626	3.2415	2.7644	2.6029	2.5280
707286	CORDCA12	Cordelia	1.6173	0.6229	0.4002	1.0715	0.9643
530440	CRNGCA12	Corning	5.1264	2.0199	1.7723	2.4855	2.9399
951721	CORNCA11	Corona	5.2996	7.6306	6.9804	2.8234	2.4771
949722	CRDMCA11	Corona Del Mar	3.9489	7.3013	5.0776	2.4928	1.6798
619723	CRNDCA11	Coronado	4.6826	4.5590	3.7886	2.4575	2.2849
949725	CSMSCA11	Costa Mesa	5.7526	7.9186	8.9433	3.5203	3.2615
707287	CTTICA12	Cotati	5.1641	6.7652	5.5089	2.7937	2.7749
530441	CTWDCA11	Cottonwood	16.1871	18.0879	13.6132	9.5679	11.5213
510011	CRCTCA02	Crockett	4.3993	0.2212	0.2295	2.7778	1.4019
209162	CWLDCA12	Crows Landing	6.6667	1.1218	0.5650	2.2436	2.0833
310608	CLCYCA11	Culver City	5.0212	7.5348	6.3469	2.9413	2.8080
925085	DAVLCA13	Danville - Tassajara (13)	5.9457	3.0704	2.7553	3.1384	2.9695
925012	DAVLCA12	Danville-Main (12)	6.8620	8.6669	6.3044	2.7468	2.6157
530442	DAVSCA11	Davis	4.9214	5.0992	3.9061	2.1453	2.0353
858727	DLMRCA12	Del Mar	5.7152	6.4677	5.6783	3.0766	2.7220
559163	DLRYCA11	Del Rey	6.3406	0.1794	0.1263	3.2486	2.9514
661367	DELNCA11	Delano	6.1844	3.1030	2.5597	2.8347	2.5436
559164	DINBCA01	Dinuba	4.7256	3.2115	2.1215	2.5400	2.2964
707443	DIXNCA11	Dixon	3.2245	3.9286	3.2075	1.6685	1.7275
619728	DLZRCA11	Dulzura	5.3672	4.6667	4.3210	5.1282	3.2710
530445	DNGNCA12	Dunnigan	22.7778	15.7738	4.9679	4.1667	4.4715
530446	DNSMCA11	Dunsmuir	3.1130	3.2585	2.9412	1.1602	1.2644
661368	ERLMCA11	Earlimart	16.5888	0.6713	0.5257	4.2587	3.8367
916478	NHLDCA11	Edgewood/N. Highl	4.1836	5.9554	6.1884	2.3984	2.2155
661369	EDWRCA01	Edwards	0.8621	0.1520	-	4.3860	-
619729	ELCJCA11	El Cajon	5.2443	8.2611	8.1579	3.1127	2.8830
760730	ELCNCA01	El Centro	3.6521	2.1503	1.9874	2.6802	2.1090
626611	ELMNCA01	El Monte	3.4978	4.1148	3.3984	1.6501	1.7518
310613	ELSGCA12	El Segundo Douglas	12.8928	3.0471	2.2958	5.8964	4.9259
949731	ELTRCA11	El Toro	3.4629	5.0293	4.8291	1.7898	1.8355
760732	ENCTCA12	Encinitas	4.4328	3.2750	2.7468	2.4261	2.2264
209192	ESCLCA11	Escalon	2.4641	3.9564	2.5011	1.3998	1.1191
760733	ESCNCA01	Escondido	4.4534	5.5563	5.8016	2.7949	2.6263

WC	CLLI	WC Name	2015	2016	2017	2018	2019
530450	ESPRCA11	Esparto	3.1031	0.4636	0.3088	1.4887	1.6567
714739	GRGVCA01	Euclid	4.8228	2.8173	2.7461	2.7582	2.6389
707289	EURKCA01	Eureka	3.2826	3.6244	3.4551	2.0626	1.7349
661383	OLDLCA11	Export / Oildale	4.2701	6.6826	6.9565	2.6194	2.2348
916451	FROKCA11	Fair Oaks	4.8710	5.5197	4.6281	2.5070	2.2637
707290	FRFDCA01	Fairfield	4.0904	6.7814	5.8570	2.3259	2.3237
760735	FLBKCA12	Fallbrook	5.1665	7.2436	6.6538	3.2463	2.9574
559165	FRVLCA11	Farmersville	5.5556	2.4404	1.9126	3.5992	2.7309
831108	FETNCA11	Felton	2.8084	2.3247	1.3863	1.4928	1.8318
805370	FLMRCA11	Fillmore	4.2698	1.5870	1.1265	1.9711	2.1385
559166	FRBHCA11	Firebaugh	4.7863	0.2679	0.2192	2.1161	1.4758
916536	FLSMCA14	Folsom - Blue Ravine	7.6550	4.0630	3.2495	3.9853	3.5810
916454	FLSMCA13	Folsom - El Dorado Hills	5.7176	4.3988	3.3682	2.8393	2.7468
916453	FLSMCA12	Folsom - Nimbus	2.8298	3.8189	3.0991	1.5352	1.2499
909736	FNTACA11	Fontana	5.0034	7.2797	7.0629	2.9821	2.9272
707291	FSVLCA11	Forestville	12.6016	5.6787	3.5494	4.1212	4.6512
707292	FTBRCA02	Fort Bragg	3.5183	6.2703	3.3008	1.6695	1.5248
707293	FTUNCA11	Fortuna	6.1789	2.3272	1.9080	3.8678	4.2453
510015	FRMTCA12	Fremont Adams (Oliver12)	4.3786	2.4726	1.9691	2.3115	2.1817
510014	FRMTCA11	Fremont Main 11	3.8603	6.1676	4.9440	1.8767	1.9124
559169	FRSNCA11	Fresno Baldwin	5.1780	4.8458	4.6644	2.5934	2.5973
559172	FRSNCA12	Fresno Clinton	3.8710	2.7431	2.9024	2.4006	1.9987
559168	FRSNCA01	Fresno Main	5.5404	1.9577	2.0273	4.0974	3.6569
559170	FRSNCA13	Fresno Sierra	5.2443	4.6859	4.3277	2.8418	2.8776
559245	FRSNCA14	Fresno West / Highway City	6.9401	3.9244	3.5762	3.9544	3.6032
559247	FRSNCA15	Fresno Woodward	6.2117	3.4812	2.7686	2.9802	3.2048
916519	WSCRCA11	Frontier	3.8864	7.2230	4.5579	2.0592	1.9052
714737	FUTNCA01	Fullerton	3.7534	6.3225	6.1719	2.3374	2.1886
209171	GALTCA11	Galt	4.4233	1.0830	0.9000	2.0168	1.9796
310615	GRDNCA01	Gardena	5.0979	8.4474	6.4355	2.5578	2.6525
858762	PCBHCA01	Garnet	4.3529	4.9764	7.5994	3.3842	3.1070
530457	GRTWCA11	Georgetown	-	-	-	-	10.5159
707294	GYVLCA11	Geyersville	5.9406	1.3316	0.9709	2.2523	2.0690
818614	GLDLCA11	Glendale	4.4183	5.5109	5.3211	2.4449	2.4065
831121	SLNSCA12	Glenview	1.1866	0.1985	0.1253	0.5389	0.5236
831110	GNZLCA11	Gonzales	7.8512	3.3517	2.4210	2.0481	1.6527
530459	GRVYCA01	Grass Valley	5.8875	11.1940	7.6014	3.3736	3.4107
831109	GNFDCA11	Green Field	5.7354	0.6980	0.4951	3.0146	2.6114
530461	GRDLCA11	Gridley	3.3652	4.4410	2.9603	1.9706	1.3913
707296	GUVLCA11	Guerneville	3.1667	1.4831	0.9792	1.3072	1.4214
209174	GUSTCA11	Gustine	4.2864	4.6566	2.9494	2.7376	2.9190
714809	YRLNCA12	Gypsum Canyon	3.5744	0.9530	0.7704	1.7241	1.9841
650016	HMBACA12	Half Moon Bay	13.8996	1.3650	1.1634	7.5464	6.3187
530462	HMCYCA11	Hamilton City	14.4231	2.8340	1.3062	2.2624	2.2989
559175	HNFRCA01	Hanford	4.4556	5.3853	4.7963	2.2861	2.2971
310618	HWTHCA01	Hawthorne	6.0096	9.0654	8.3645	2.9867	3.0955
510018	HYWRCA11	Hayward Depot	3.9291	2.2400	1.9290	2.0324	2.0386
510017	HYWRCA01	Hayward Main	4.0801	5.1232	3.9363	2.0510	1.8783
707297	HLBGCA11	Healdsburg	2.0566	3.1539	2.2327	1.2556	1.4971
209176	HERLCA11	Herald	4.9242	7.5130	5.8923	4.2222	2.8796
510080	HRCLCA11	Hercules-Pinole	4.1192	2.8628	2.2826	1.8856	1.8001
831120	SLNSCA11	Hickory/Salinas	3.4546	2.4215	2.1102	1.3839	1.5463
909741	HGLDCA11	Highland	5.1036	9.0711	7.7149	2.8105	2.4240
831111	HLSTCA11	Hollister	4.1898	4.5106	3.4596	2.0013	1.7171
323616	HLWDCA01	Hollywood	4.0697	5.6097	5.8256	2.3331	2.2088
760742	HLVLCA11	Holtville	4.3561	0.9835	0.9241	1.6553	2.0192
530463	HMWDCA11	Homewood	15.8951	12.9534	6.4352	2.5776	2.1368
858763	PCBHCA11	Hornblend	7.7730	1.4483	1.3347	6.0039	6.4493
209177	HGSNCA11	Hughson	5.1431	1.0261	1.0876	2.2578	2.4653
831122	SLNSCA13	Hunter	8.5341	7.0957	5.4192	3.5088	5.8244
323617	HNPKCA01	Huntington Park	4.2818	4.1667	4.2233	2.5468	2.3588
559178	HURNCA11	Huron	45.1149	1.0685	0.8232	7.3118	4.8043
415019	IGNCCA12	Ignacio	5.4535	1.7578	1.2538	2.3009	2.6149
760743	IMPRCA11	Imperial	2.7744	1.4613	1.0046	1.7193	1.5985
619744	IMBHCA11	Imperial Beach	5.8178	2.4979	2.9617	4.2830	3.8615
310619	IGWDCA01	Inglewood	5.1586	6.5082	5.5396	2.5363	2.6648

WC	CLLI	WC Name	2015	2016	2017	2018	2019
415020	INVRCA11	Inverness	10.0660	1.8357	1.2857	2.0227	1.1084
209179	IONECA11	Ione	45.3431	16.7385	14.0741	21.2963	20.9480
949745	IRVNCA01	Irvine	5.5660	8.1325	9.5282	3.4732	3.0165
949807	IRVNCA11	Irvine/Airport	0.8624	1.0429	1.2723	1.0042	1.0810
559180	IVNHCA11	Ivanhoe	4.7200	5.0452	5.1620	4.3210	2.3256
209181	JCSNCA01	Jackson	3.4214	6.0701	2.9450	1.5319	1.3038
209182	JMTWCA11	Jamestown	109.0909	2.4096	2.5950	75.6944	64.1026
619851	JAMLCA60	Jamul	15.1667	3.8432	3.7457	8.1439	7.9418
760748	JULNCA12	Julian	2.5831	4.3142	2.3201	1.3493	1.5793
831112	KGCYCA11	King City	4.4720	3.6387	2.5471	2.6629	1.8784
559183	KGBGCA11	Kingsburg	5.1897	3.2125	2.8912	2.6876	2.2982
530465	KYBRCA11	Kyburz	0.8258	0.3497	0.5005	0.7527	0.6127
818621	LACRCA11	La Crescenta	5.6635	11.2177	6.7862	2.5294	2.6582
858750	LAJLCA11	La Jolla / Girard	6.9783	3.2239	2.8758	4.5227	3.7846
619752	LAMSCA01	La Mesa	3.8687	4.8272	5.2070	2.5585	2.4140
925022	LFYTCA11	Lafayette	5.1782	9.5596	7.2781	2.7379	2.5761
209185	LGRNCA12	LaGrande/D Pedro	3.5441	2.4837	2.1693	1.9144	2.2556
949749	LGNGCA12	Laguna Niguel	5.4468	6.8757	7.0574	3.1238	2.8137
661405	LKLACA11	Lake Los Angeles	2.9762	4.5550	3.5439	1.9144	1.6618
530532	GRVYCA11	Lake of the Pine	10.3348	1.8364	1.4234	6.3373	7.7815
707302	LKPTCA02	Lakeport	3.6475	3.9495	2.9700	2.0320	1.9439
619751	LKSDCA12	Lakeside	4.2688	4.8077	4.5709	2.3087	2.3374
661372	LAMTCA11	Lamont	6.4783	0.8643	0.6670	3.6047	2.2501
415023	LRKSCA11	Larkspur/Corte Madera	6.6427	2.2603	1.6044	3.0091	3.0448
209187	LGRDCA11	Le Grande	6.5657	0.2587	0.1762	2.0022	1.5931
661373	LEBCCA11	Lebec	5.1336	3.7651	2.9595	1.6741	1.9048
559188	LEMRC A11	Lemore Main	5.3866	5.7450	5.5093	2.8035	3.1667
559189	LEMRC A12	Lemore Wyman	18.9815	0.3974	0.2335	0.9174	0.1667
661374	LNVC A11	Leona Valley	1.9477	1.1678	1.0236	1.5859	0.9503
916467	LNCLCA11	Lincoln	3.8889	5.3878	4.8936	2.0686	2.2051
661375	LTRKCA11	Little Rock	18.9815	4.8160	4.8913	6.2169	6.9554
530468	LVOKCA11	Live Oak	5.0838	0.5508	0.5634	3.0475	2.9136
925025	LVMRC A11	Livermore	4.0047	7.3537	4.8659	1.8401	1.7873
209190	LCFRCA11	Lockeford	9.7424	2.8535	2.3939	3.6062	4.4365
209191	LODICA01	Lodi	4.0685	6.2197	4.7779	1.9007	1.9777
707303	LOLTCA11	Lolita	1.0234	0.0526	0.0348	0.1996	0.1623
310622	LOMTCA11	Lomita	5.7372	9.2263	6.7954	2.9865	2.9554
916470	LOMSC A11	Loomis	11.7080	17.4754	10.9795	7.1484	5.7381
707319	SNRSC A11	Los Alamos	4.5527	1.9626	1.5496	2.1004	2.0005
650024	LSATCA11	Los Altos	15.2677	5.1480	3.8974	8.4058	8.0863
209193	LSBNCA12	Los Banos	4.1918	4.9524	3.2949	2.0242	1.8899
530469	LSMLCA11	Los Molinos	12.2984	1.9138	2.0175	4.6315	3.8838
707304	LWLKCA11	Lower Lake	5.9930	6.5760	4.0063	2.0991	3.0322
323635	LSANCA14	LSAN Adams	4.3209	2.5578	2.3383	2.4490	2.3309
310628	LSANCA07	LSAN Airport	5.1427	5.7294	4.9330	2.5801	2.7778
323641	LSANCA34	LSAN Angeles	4.4559	5.7372	5.4639	2.8718	2.4731
323636	LSANCA15	LSAN Axminster	7.5150	8.3813	6.1983	3.5020	3.5857
323638	LSANCA23	LSAN Capitol	3.9702	2.1936	1.9400	2.7167	2.4614
323644	LSANCA56	LSAN Clinton	5.3673	4.0881	3.3169	3.1057	2.9252
323629	LSANCA08	LSAN Melrose	4.3673	4.0472	3.9698	2.4814	2.1159
323642	LSANCA35	LSAN Montebello	4.3623	3.8664	3.7951	2.4841	2.4851
323626	LSANCA05	LSAN Pleasant	5.9522	9.0936	7.7477	3.6382	3.3385
323634	LSANCA13	LSAN Plymouth	7.3511	6.9410	5.5225	4.1713	4.4542
323643	LSANCA38	LSAN Republic	3.8663	3.2693	3.0617	2.4805	2.0633
323640	LSANCA29	LSAN Sunset	4.0044	2.5652	2.8024	3.0134	2.7709
323631	LSANCA10	LSAN Webster	5.8643	7.5737	6.9226	3.4649	3.1465
559243	MADRCA12	Madera Bonnadelli	1.2219	0.6157	0.4646	0.6457	0.6989
559194	MADRCA11	Madera Main	4.0920	4.6381	3.8841	2.3071	2.0302
213624	LSANCA02	Madison 02 / MO	4.3936	4.0512	4.2970	2.9925	2.3569
213625	LSANCA03	Madison 03 / MA	2.5831	1.7843	2.3725	2.1190	1.8509
831113	MARNCA11	Marina	6.6019	4.5310	3.4875	3.2646	3.4940
925030	MRTZCA11	Martinez	5.0109	4.7330	4.1701	2.5999	2.6555
530472	MYVICA01	Marysville	4.4780	2.0704	1.7927	2.4666	2.5883
408139	SNVACA11	Mathilda / Sunneyvale	2.0211	0.5298	0.5513	1.3995	1.0901
707307	MKVLCA11	McKinleyville	3.9711	4.1973	3.8726	2.4644	2.6957
707305	MNDCCA11	Mendocino	14.9306	0.7906	0.4724	3.3333	2.3333

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559195	MNDTCA11	Mendota	10.7407	11.2195	8.3761	6.5000	5.4890
650028	MNPKCA11	Menlo Park	10.2381	17.5000	10.4647	4.3983	5.0207
209196	MRCDA01	Merced	4.0292	4.8979	4.1267	1.8815	1.8052
707306	MDTWCA11	Middletown	6.3441	0.9146	0.7084	2.5561	2.5386
415027	MLVYCA01	Mill Valley	5.4038	2.3556	2.1731	2.4733	2.5170
650026	MLBRCA11	Millbrae	4.7183	7.0764	5.2910	2.4729	2.8567
408114	MLPSCA11	Milpitas	3.6018	4.1106	3.8601	1.9098	1.9260
949806	MSVJCAAT	Mission Viejo	5.9241	7.4943	8.0882	4.1009	4.3381
209200	MDSTCA03	Modesto Kellog / South / Ceres	4.9343	1.9111	1.6262	2.6406	2.5192
209201	MDSTCA04	Modesto Kingswood / Curtis / Salida	3.4808	1.9057	1.7169	1.5056	1.6879
209199	MDSTCA02	Modesto Main	6.4057	9.0592	7.3475	2.9175	2.9491
209248	MDSTCA05	Modesto Tally	1.8092	2.1319	1.4946	0.8143	0.7216
661376	MOJVCA01	Mojave	6.3298	2.5383	1.7515	6.2883	3.8333
530529	MTAGCA11	Montague	2.7473	0.9354	0.6260	0.8922	1.0929
831115	MTRYCA01	Monterey	5.4563	8.0321	5.7840	2.4034	2.6329
805377	MRPKCA12	Moorpark	5.7529	7.2502	6.0072	2.5720	2.3598
925029	MORGCA12	Moraga	6.2197	8.0620	5.1806	3.1333	3.4553
831123	SLNSCA14	Moro	71.3542	51.3889	40.5039	22.6397	18.1435
805378	MRBACA11	Morro Bay	1.8084	2.1535	1.6817	1.1499	1.0221
650031	MSBHCA11	Moss Beach	10.1010	1.0124	0.8559	2.7236	2.4116
530474	MTSHCA12	Mount Shasta	4.7459	0.9793	0.9137	2.1470	1.8069
650032	MTVWCA11	Mountain View	3.8284	6.7388	4.4521	1.8971	1.7789
209203	MRPHCA11	Murphys	10.8059	18.1818	10.0000	2.5522	3.4606
707310	NAPACA01	Napa	4.7175	5.9978	4.7046	2.5625	2.3728
619754	NTCYCA11	National City - Highland	3.7324	4.9499	4.8896	3.0711	2.6392
530475	NVCYCA11	Nevada City	8.0169	4.2903	4.2444	4.3900	5.8637
916476	NWCSCA11	Newcastle	6.3866	6.1085	4.7502	3.8260	3.9909
661379	NHLLCA01	Newhall	4.6055	4.2594	4.0437	2.6550	2.4267
209204	NWMNCA12	Newman	3.7674	4.4748	3.7265	2.2329	1.8610
818646	NHWDCA01	NHWD / Lankershim	4.0788	2.7425	2.7746	2.5554	2.5685
818647	NHWDCA02	NHWD / Magnolia	4.5627	4.5550	4.7157	2.9797	2.7429
707311	NICECA11	Nice	12.6126	0.3465	0.3299	3.4953	4.2457
530477	NCLSCA11	Nicolaus	0.2618	0.0370	0.0397	0.6041	0.3925
760855	NILDCA11	Niland Main	31.2500	2.7778	3.4014	16.6667	9.8039
805380	NIPMCA11	Nipomo	3.4442	3.9607	2.7152	1.8687	1.3480
323633	LSANCA12	Normandy	4.6631	3.7796	3.2409	2.5149	2.4737
916537	NSCRCA12	North Natomas	4.5822	2.6524	2.6196	2.6391	2.4821
530480	NSJNCA11	North San Juan	2.4590	0.2049	0.1776	1.0417	1.3770
818648	NORGCA11	Northridge	4.3624	6.6702	7.0265	2.6983	2.7344
209205	OKDLCA11	Oakdale	3.5857	4.1445	3.1875	1.8765	1.7183
510038	OKLDCA11	Oakland 45th/Olympic(Central)	4.9675	5.0908	4.2081	2.4571	2.5891
510036	OKLDCA03	Oakland Franklin	4.7499	4.4755	4.2565	3.0448	2.9024
510039	OKLDCA12	Oakland Holly	4.5795	5.3205	4.2861	2.7315	2.5481
510037	OKLDCA04	Oakland Kellog(Fruitvale)	5.8140	4.7317	4.7959	2.9559	2.8211
510040	OKLDCA13	Oakland Mountain	4.2973	2.7150	1.8273	2.0712	2.0591
925041	OKLYCA11	Oakley	4.4834	2.5017	2.0131	2.0642	1.9252
805381	OKVWCA11	Oakview	446.6667	1.1200	1.0897	61.6667	60.5556
760758	OCSDCA11	Oceanside / Mission	4.8936	6.4194	7.7479	3.0840	2.9935
805382	OJAICA11	Ojai	3.4095	1.3366	1.1400	2.3401	2.1244
714759	ORNGCA11	Orange Chapman	3.9142	6.5306	6.1611	2.3309	2.1447
559206	ORCVCA11	Orange Cove	6.7691	1.7220	1.2149	5.1587	3.2878
714760	ORNGCA13	Orange Olive	5.9986	4.7727	3.6892	2.8521	2.6804
714761	ORNGCA14	Orange West	3.6395	1.7060	1.5348	2.6133	2.2274
916482	ORVACA11	Orangevale	2.5307	3.8662	2.6626	1.5434	1.3453
925042	ORNDCA11	Orinda	14.5276	3.7281	3.4801	8.7459	9.8797
530483	ORLDCA11	Orland	4.7878	4.6318	3.5454	2.2706	1.9043
559207	ORSICA11	Orosi	3.7787	2.2815	2.1435	2.7555	2.0888
530485	ORVLA12	Oroville East	5.6868	5.0732	4.1630	2.5741	2.8620
530484	ORVLA11	Oroville Main	5.8881	1.9059	1.5557	3.9661	3.1496
619853	OTMNSCA11	Otay Mesa	2.8278	2.6304	3.1569	1.7605	2.1212
650043	PCFCCA11	Pacifica	7.1204	10.2199	7.7558	3.3501	3.5012
661384	PLDLCA01	Palmdale	5.2204	3.6853	2.9733	2.9067	2.6794
661412	PLDLCA11	Palmdale East / 47TH ST	3.0641	1.6181	1.4363	1.7974	1.7478
650045	PLALCA02	Palo Alto Main	3.8510	6.4688	4.6509	1.8463	1.9468
650046	PLALCA12	Palo Alto South	3.7821	1.8815	1.3137	1.4549	1.5037
530486	PRDSCA11	Paradise Main	7.4520	6.5094	5.5472	5.0758	5.0641

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530487	PRDSCA12	Paradise Pines	5.5205	4.0435	3.5001	3.1919	5.4577
562649	PRMTCA01	Paramount	4.1040	6.2056	6.1424	2.4509	2.4633
415073	SNRFCA11	Parkway	3.7745	3.8429	2.7681	1.6484	1.5307
559208	PRLRCA11	Parlier	4.3548	2.4788	1.4777	3.8221	3.3654
626651	PSDNCA12	Pasadena / Lake	4.8460	5.2176	4.0249	2.5781	2.3616
626650	PSDNCA11	Pasadena / Mt Wilson / Green	4.0944	7.0261	5.5479	2.2584	2.2425
805385	PSRBCA01	Paso Robles	2.8544	0.3598	0.3788	1.5887	1.5358
760764	PALACA11	Pauma Valley	0.3602	0.2231	0.2064	0.3228	0.2933
951765	PDLYCA11	Pedley	2.9519	4.1635	4.3279	2.0629	1.6938
650051	PSCDCA11	Pescadero	7.0755	2.1968	1.4620	0.9443	1.6616
707314	PTLMCA01	Petaluma	4.6118	6.5558	4.7448	1.8700	1.9988
619766	PNVYCA11	Pine Valley	3.3658	3.2300	1.9573	1.6667	2.3810
805386	PIRUCA11	Piru	0.2734	0.0703	0.0590	0.1779	0.1792
805387	PSBHCA11	Pismo Beach	2.3913	1.0164	0.6694	1.5066	1.1594
925050	PSBGCA11	Pittsburg Bay Point / Willow	4.4293	2.6072	2.2311	2.4866	2.3041
925049	PSBGCA01	Pittsburg Main	4.6587	3.3721	2.9711	2.4648	2.5603
559210	PXLYCA11	Pixley	5.0813	7.1946	4.9315	3.0425	1.9522
714767	PLCNCA11	Placentia	4.7258	5.4957	5.1035	2.8462	2.4425
530489	PLVLCA11	Placerville - Main	5.2068	8.2746	6.3310	3.0763	3.7224
530490	PLVLCA12	Placerville - Niagara	11.8421	3.2938	2.7187	8.9041	8.5470
925083	PLTNCA13	Pleasanton Hacienda	0.7446	0.2233	0.2318	0.5348	0.6606
925047	PLTNCA12	Pleasanton Main/Hopyard	5.1455	9.7972	7.1219	2.5231	2.3346
209212	PLMOCA11	Plymouth	12.1622	0.6223	0.5696	2.7397	3.3011
559213	PTVLCA11	Porterville	4.5548	2.1243	1.5608	2.1283	1.9319
858768	POWYCA11	Poway Midland	5.1578	6.3506	6.4431	3.7084	3.8499
949808	RSMGCA11	R. S. Margarita	4.6902	5.7012	5.5108	2.6611	2.2299
760769	RAMNCA11	Ramona	5.1613	6.1278	4.5148	2.1797	2.3084
213632	LSANCA11	Rampart	2.9443	2.3527	2.2358	1.9114	1.8146
858770	RBRNCA11	Rancho Bernardo	3.3790	3.9022	3.7669	2.0790	1.8320
858854	RNPSCA11	Rancho Penasquitos	4.2937	2.3928	1.9838	2.2397	2.1285
619852	RNSDCA11	Rancho San Diego	3.7412	2.1050	2.1247	2.4823	2.1088
858771	RSFECA12	Rancho Santa Fe	49.9045	8.3416	6.0988	6.2289	5.6702
530494	RDBLCA01	Red Bluff	4.3007	1.0014	0.8714	2.3823	2.0753
530531	RDNGCA11	Redding Enterpr	3.7486	2.6091	3.3077	2.7322	2.7318
530495	RDNGCA02	Redding Main	9.2094	1.9983	2.1678	4.9932	4.9641
650053	RDCYCA01	Redwood City	5.0995	6.9160	5.4032	2.4441	2.5945
818652	RESDCA01	Reseda	6.2195	7.9728	7.7709	3.3863	3.3930
909773	RILTCA11	Rialto	5.8048	7.1292	7.5396	3.5993	3.0582
510013	ELSBCA11	Rich-Appian Way/El Sobrante	5.4014	4.7017	3.6696	3.0253	2.9432
213630	LSANCA09	Richmond	5.2530	1.9845	1.9427	3.3060	3.2194
510052	RCMDCA11	Richmond-SF	4.8780	7.3436	6.2852	2.9894	2.6442
707317	RIDECA11	Rio Dell	3.4591	0.2048	0.1825	3.2300	2.5588
916526	RILNCA12	Rio Linda	2.7498	4.1572	4.0949	2.1085	1.7210
209214	RVRBCA11	Riverbank	7.8602	9.4742	7.1408	3.1008	3.3378
559215	RVDLCA11	Riverdale	3.5240	0.8766	0.7172	2.1597	2.1807
951774	RVSDCA01	Riverside Orange	4.2197	5.4060	6.1362	2.7141	2.4389
916527	RCKLCA11	Rocklin	6.4014	1.4995	1.1661	3.2647	2.9163
707337	RTPKCA11	Rohnert Park	4.9515	2.4425	1.6170	2.5333	2.4881
661388	RSMDCA11	Rosamond	5.5556	5.7479	4.7040	3.4694	3.1476
626654	ROSMCA11	Rosemead	3.9768	4.4341	3.7010	2.2001	2.1515
949791	SJCPCA12	S. J. Capistrano	6.3618	1.8336	1.7021	3.9439	3.4698
916497	SCRMCA01	Sacramento Mn	2.8452	3.4201	3.2519	1.6701	1.6424
831119	SLNSCA01	Salinas Main	4.1935	3.1029	2.4987	1.8026	1.9274
650055	SNBUCA02	San Bruno	4.7164	5.8974	4.3839	2.4152	2.3205
650056	SNCRCA11	San Carlos	3.7152	4.4528	3.1960	1.7738	1.7152
949776	SNCLCA12	San Clemente	4.8879	1.4833	1.5682	2.5027	2.5544
626658	SNGBCA01	San Gabriel	6.5813	10.5934	8.2481	3.2432	3.4689
408134	SNJSCA18	San Jose Almaden Valley	5.9699	3.7881	2.7214	2.6470	2.4482
408131	SNJSCA13	San Jose Chynoweth	4.8006	3.7846	3.1720	2.4258	2.4455
408130	SNJSCA12	San Jose Dial Way	5.3762	4.9185	3.7380	2.8479	2.7682
408133	SNJSCA15	San Jose Evergreen / San Felipe	5.4288	2.1458	1.7287	2.3035	2.5254
408132	SNJSCA14	San Jose Foxworthy	4.2763	4.1759	3.4559	2.2563	2.1514
408145	SNJSCA21	San Jose Junction	4.9321	1.4601	1.7889	4.1338	3.1704
408128	SNJSCA02	San Jose Main	3.3899	5.4190	5.2506	2.0115	1.9861
408129	SNJSCA11	San Jose White Rd	3.9423	3.5705	3.1661	2.0147	1.9284
831127	SNJNCA11	San Juan Baustista	2.5292	0.2874	0.3587	0.8646	0.7014

WC	CLLI	WC Name	2015	2016	2017	2018	2019
510070	SNLNCA11	San Leandro	5.6479	9.9375	6.8088	2.8343	2.8421
805389	SNLOCA01	San Luis Obispo	2.1582	0.5124	0.4353	1.5743	0.8805
408136	SNMACA11	San Martin	4.3981	3.0540	3.3923	3.5477	2.8309
650071	SNMTCA11	San Mateo	5.3138	9.4905	6.4314	2.4610	2.3746
310659	SNPDCA01	San Pedro	4.7827	3.8581	3.4262	2.9833	2.7792
415072	SNRFCA01	San Rafael Main	7.9460	9.1429	7.2542	4.0110	4.1274
925074	SNRMCA11	San Ramon	5.1992	4.9369	4.5918	2.5534	2.4402
619794	SNYSCA12	San Ysidro	5.2806	5.2399	5.1165	3.5042	3.4082
714804	SNANCA12	Santa Ana West / SNAN Bolsa	4.1214	1.8864	1.8782	2.8312	2.7458
408137	SNTCCA11	Santa Clara Bellomy	4.2114	6.7995	5.5793	2.3167	2.3060
408143	SNTCCA01	Santa Clara Spacepark	2.1277	0.9243	0.8461	1.9082	1.8027
831125	SNCZCA01	Santa Cruz	7.2318	2.6792	2.1439	3.5969	2.6038
831126	SNCZCA11	Santa Cruz-Capitola	4.2552	4.9179	3.8766	1.9396	1.7520
707320	SNRSCA01	Santa Rosa Main	4.7376	5.7615	4.5886	2.2485	2.2091
619795	SANTCA01	Santee	3.5610	2.1292	2.2473	2.3301	2.0710
805391	SATCCA12	Saticoy	3.8503	1.9271	2.0761	1.9843	2.0764
661407	SAGSCA11	Saugus	5.3176	4.5742	3.8417	2.4556	2.5717
415075	SSLTCA11	Sausalito Larkspur	4.6399	2.1088	1.6417	2.4438	2.5602
831116	SCVYCA01	Scotts Valley	5.9269	2.7425	2.4718	2.9675	2.8092
916501	SCRMCA12	SCRM - Empire	5.0716	4.0637	3.6636	2.7005	2.5428
916502	SCRMCA13	SCRM - Fruitridge	5.6631	2.4154	2.1508	2.7647	2.8211
916499	SCRMCA03	SCRM - Garden	5.3607	5.0750	4.5347	2.8549	2.8523
916500	SCRMCA11	SCRM - Gladstone	4.2223	2.2938	2.2983	2.4486	2.3123
916498	SCRMCA02	SCRM - Ivanhoe	5.8294	6.7729	5.8905	3.2370	3.1373
831117	SESDCA11	Seaside	3.4904	4.3106	3.8752	1.9249	1.7341
707321	SBSTCA11	Sebastapol	6.3228	4.6472	3.7847	2.7263	2.6913
559217	SELMCA11	Selma	4.9863	8.3231	6.3303	2.5071	2.2214
415058	SNFCCA01	SF Bush Pine	2.3819	1.1143	1.1852	2.0598	1.6606
415064	SNFCCA13	SF Evergreen-9th Ave	4.7889	2.5327	1.9661	2.3722	2.1567
415068	SNFCCA21	SF Folsom	2.6907	1.9322	2.3104	1.9785	2.0440
415061	SNFCCA06	SF Juniper-Onondaga	4.9936	5.2883	4.0017	2.2559	2.2376
415067	SNFCCA12	SF Larkin-Steiner	4.2201	3.2721	2.8412	2.0361	2.0216
415059	SNFCCA04	SF Market-McCoppin	3.4847	3.7806	2.9613	1.7473	1.7698
415060	SNFCCA05	SF Mission-25th St	4.7867	4.2525	3.1067	2.1522	1.9848
415065	SNFCCA14	SF Montrose-19th	3.8837	5.2237	3.9232	1.8519	1.9236
415066	SNFCCA17	SF Third St.	3.9714	1.6258	1.5042	2.1003	2.0548
661392	SHFTCA11	Shafter	6.4879	1.9072	1.3079	3.3728	2.9306
818656	SHOKCA01	Sherman Oaks	5.9200	9.2757	8.0005	3.3373	3.2190
530504	SGSPCA11	Shingle Springs	4.2897	3.4742	2.8974	2.0443	1.9595
714797	SLVRCA11	Silverado	15.9420	2.9536	2.3551	1.2195	1.6667
805393	SIMICA11	Simi	5.0088	5.1764	4.2552	2.5351	2.4558
530507	SMAVCA11	Smartsville	6.8376	6.0000	5.0926	2.6316	2.2472
619781	SNDGCA06	SNDG 37th Street	2.4789	2.2286	3.0455	2.2364	2.2986
619777	SNDGCA01	SNDG C Street	3.0051	2.5677	3.6033	2.6514	2.6133
619782	SNDGCA11	SNDG College	4.1815	2.9687	3.0907	2.7556	2.7881
858779	SNDGCA03	SNDG Linda Vista	3.7361	3.7736	4.7987	2.7443	2.4170
619783	SNDGCA12	SNDG Market Street	5.7906	4.7798	4.8922	3.3205	3.2909
858786	SNDGCA16	SNDG Mira Mesa	3.3144	3.3675	3.3650	2.1695	2.1641
858785	SNDGCA15	SNDG Regents	2.6683	2.5463	3.6480	2.1996	2.3302
619780	SNDGCA05	SNDG Saipan	4.6628	2.8665	2.9796	3.2776	2.6847
619784	SNDGCA14	SNDG Tennyson	4.2695	3.1313	3.5413	3.1041	2.9085
619778	SNDGCA02	SNDG University	3.0166	2.8487	3.8721	2.4199	2.5078
530508	SDSPCA11	Soda Springs	55.5556	2.6427	4.3575	7.0743	16.4083
831118	SLDDCA11	Soledad	5.7214	2.4904	1.8553	2.7676	2.2597
661394	SLMNCA11	Solemint	4.7927	5.9031	5.9137	2.8531	2.5452
707323	SONMCA12	Sonoma	5.6155	6.6044	4.3267	2.4294	2.6400
209218	SNRACA13	Sonora	3.5448	1.1631	1.1560	1.9750	1.9522
626660	SPSDCA11	Sout Pasadena / Mission	4.5356	3.6198	2.9705	2.6313	2.2404
323655	SGATCA01	South Gate	3.7831	4.2937	3.6903	2.4566	1.9968
530512	STAHCA13	South Tahoe - Meyers/Apache	6.4738	11.7253	5.9051	2.6397	1.9628
530509	STAHCA01	South Tahoe - Sussex	5.4426	3.3830	2.6767	2.4201	2.1095
530511	STAHCA12	South Tahoe - Tamarack	10.7843	0.1375	0.7353	5.1587	3.1250
949810	IRVNCA12	Spectrum-Irvine	1.2614	0.4219	0.4928	1.5873	2.0266
707318	STHNCA11	St. Helena	5.4209	3.7317	2.7273	2.9371	3.1683
916541	RCKLCA01	Stanford Ranch	5.2596	5.3899	3.7214	2.3510	2.2789
415076	STBHCA11	Stinson Beach	9.5710	3.5590	1.9849	2.2097	1.7464

WC	CLLI	WC Name	2015	2016	2017	2018	2019
209222	SKTNCA12	Stockton Ashley	0.9322	0.2675	0.2633	0.6971	0.6603
209221	SKTNCA11	Stockton Granite	6.3730	5.9351	5.0261	3.2147	3.2084
209220	SKTNCA01	Stockton Main	5.0459	5.5175	5.4077	2.8253	2.9347
209223	SKTNCA14	Stockton Redwood	4.3460	3.5423	3.0603	1.8350	2.0819
707324	SUISCA11	Suisun City	10.3333	3.5674	4.5131	14.3275	9.0136
209225	STCKCA11	Sutter Creek	3.9058	3.6745	2.6256	1.4119	1.8403
530514	THCYCA01	Tahoe City	5.8081	0.7182	0.6148	1.2333	2.1238
661395	THCHCA01	Techachapi	2.7630	3.5542	2.6383	1.4368	1.3094
805396	TMTNCA11	Templeton	3.1783	4.7386	3.6210	1.4583	1.3675
209227	THTNCA11	Thornton	6.0000	2.6042	2.4494	3.8288	2.6144
415005	TBRNCA11	Tiburon	2.6667	5.3753	3.6683	1.4787	1.4392
559229	TPTNCA11	Tipton	9.2141	2.6440	3.3172	3.3987	4.1284
310661	TRNCCA11	Torrance	4.3993	2.9556	2.3299	2.1612	2.0258
209230	TRACCA11	Tracy	4.8855	7.7376	6.7154	2.5978	2.5367
530515	TRUCCA11	Truckee	4.7882	7.4245	4.3681	1.2756	1.1045
559231	TULRCA11	Tulare	4.3362	4.4825	3.9857	2.1790	2.2642
209232	TRLCCA11	Turlock	4.2014	3.3732	2.9349	2.2836	2.1540
714798	TUSTCA11	Tustin 11	5.0934	5.6848	4.4628	2.5473	2.3472
209233	TWHRCA11	Twain Harte	7.7617	0.6813	0.7002	3.2268	3.8867
707328	UKIHCA01	Ukiah Main	4.5501	6.4295	4.9515	2.9915	2.7230
213627	LSANCA06	Union	3.5531	1.6585	1.6650	2.5165	2.4519
510078	UNCYCA11	Union City	5.7497	9.2013	7.5077	2.9132	2.9968
707329	UPLKCA11	Upper Lake	6.6872	0.3919	0.2585	2.7348	2.4892
707330	VCVLC A12	Vacaville	4.4216	7.2369	6.0218	2.3026	2.2809
707331	VLLJCA01	Vallejo	4.9754	6.0413	5.2842	2.4520	2.3961
760799	VLCTCA11	Valley Center	6.1594	1.9499	1.6592	2.9201	2.4941
818662	VNNYCA02	Van Nuys	4.5387	3.3530	3.2282	2.8693	2.7570
805400	VNTRCA02	Ventura / Fir	4.0980	0.9524	0.8855	2.4446	2.3631
805399	VNTRCA11	Ventura Main / Montalvo	4.7383	4.4471	3.6126	2.4611	2.2093
559235	VISLCA11	Visalia Main	4.4386	3.8472	3.3277	2.3382	2.2468
760800	VISTCA12	Vista	3.4725	3.0068	3.4990	2.4386	2.4036
916479	NSCRCA11	Wabash	3.9558	2.8844	2.8283	2.5576	2.3512
209236	WLLCCA11	Wallace	4.3210	10.9756	5.8608	1.0300	1.9309
925079	WNCKCA11	Walnut Creek	4.4991	7.4008	5.2306	2.1686	2.0496
661402	WASCCA01	Wasco	3.1123	2.1510	1.6343	2.1082	1.7963
209237	WTFRCA11	Waterford	5.1039	1.1377	0.9023	3.3469	2.6547
831141	WTVLCA01	Watsonville	3.7312	6.0875	4.5169	1.6398	1.5218
530518	WEEDCA01	Weed	5.2846	2.3139	2.1441	1.7456	2.0492
530520	WTL DCA12	Wheatland	1.1111	1.3486	0.5890	0.6318	0.6441
530535	GRVYCA12	Wildwood	5.5342	7.3815	4.9314	2.0857	2.2642
707334	WLTSCA12	Willits	3.6822	0.6946	0.4296	2.1916	2.4249
530521	WLWSCA11	Willows	4.7346	4.6916	2.6893	2.6646	2.0949
310664	WLMGCA01	Wilmington	5.1972	8.7795	7.4579	2.5572	2.5517
707335	WNDSCA11	Windsor	5.7712	1.8789	1.2594	2.7431	2.2543
530522	WNTRCA11	Winters	16.5698	13.8441	8.8542	9.6065	6.2738
951775	RVSDCA11	Woodcrest	5.9260	3.0166	2.2311	2.6056	2.4585
559239	WDLKCA11	Woodlake	7.6000	1.0039	0.9335	5.0432	2.5087
530523	WDL DCA11	Woodland	4.6767	6.8469	5.1506	2.2975	2.3740
714802	YRLNCA11	Yorba Linda	4.5488	7.4491	5.2123	2.1576	2.1597
707336	YNV LCA11	Yountville	5.3407	0.2763	0.2574	2.3810	3.3794
530524	YREKCA11	Yreka	3.8050	5.4593	3.3333	2.5641	2.0657
530525	YBCYCA01	Yuba City / Marysville	3.9746	2.5839	2.1931	2.0957	2.1292

Table 14.10

AT&T CALIFORNIA
VoIP OUT-OF-SERVICE REPORTS PER HUNDRED ACCESS LINES (TRPH) BY WIRE CENTER
AVERAGE PER MONTH
2015-2019

WC	CLLI	WC Name	2015	2016	2017	2018	2019
661410	ACTNCA11	Acton	6.7308	5.4131	6.9767	6.0185	9.2157
818600	AGORCA11	Agoura	2.8607	2.5277	2.0538	1.7768	1.8766
661351	AGDLCA11	Agua Dulce	1.4056	1.7143	1.1826	0.9533	1.0462
510002	ALMDCA11	Alameda/Central	2.4765	2.2767	1.9667	1.3648	1.2003
510001	ALBYCA11	Albany/Solano	2.9510	3.0068	2.6360	1.7490	1.5629
626601	ALHBCA01	Alhambra	2.5097	2.2541	2.0751	1.6158	1.4303
619700	ALPICA12	Alpine	3.2641	2.9965	2.1731	1.7590	1.9465
714702	ANHMCA11	Anaheim Cypress	2.8022	2.4929	2.5244	2.0076	1.8301
714703	ANHMCA12	Anaheim La Palma	2.7875	2.9287	2.8144	2.3592	3.3395
714701	ANHMCA01	Anaheim Lemon	1.8427	1.7269	1.9098	1.3884	1.3225
530427	ARSNCA11	Anderson	2.6343	1.9746	1.8139	1.6405	1.9987
209150	ANCMCA01	Angels Camp	4.6171	2.9915	2.3910	1.7037	1.6944
707275	ANGWCA11	Angwin	2.9982	2.6022	1.9306	1.4922	1.5599
714811	ANHMCA17	ANHM Hills	2.3868	2.3633	1.9633	1.1822	1.4723
925003	ANTCCA11	Antioch	2.2612	1.9440	1.7424	1.3301	1.3242
831100	APTSCA12	Aptos	3.6661	2.9751	2.3636	1.7981	1.7910
626602	ARCDCA11	Arcadia	2.0189	1.7865	1.5096	1.2765	1.0891
707276	ARCTCA11	Arcata	1.2048	1.6934	1.3489	1.6200	1.5427
951704	ARTNCA11	Arlington	2.2330	2.0591	2.1557	1.6088	1.5442
209151	ARNLCA11	Arnold	10.0000	2.5749	2.5213	1.0832	1.8148
831144	ARMSCA11	Aromas	5.9028	4.5640	2.9245	3.3268	2.1830
805352	ARGRCA12	Arroyo Grande	1.8834	2.0774	1.7035	1.3074	1.5162
661353	ARVNCA11	Arvin	5.9269	5.4601	3.9305	3.0341	3.6125
805354	ATSCCA11	Atascadero	2.3611	2.4125	2.1223	1.6026	2.3573
209153	ATWRCA12	Atwater	2.8788	2.9922	2.6262	1.7259	2.0256
530428	AUBNCA01	Auburn - Main	2.0968	1.9923	1.5686	1.4247	1.4450
530429	AUBNCA11	Auburn - Placer Hills	3.6186	3.1831	3.1987	1.7004	2.5704
559154	AVNLCA12	Avenal	2.9769	2.9393	2.1727	1.9994	2.1289
661361	BKFDCA17	Bakersfield West / Rosedale	2.1386	3.4805	3.2536	1.2380	1.2418
661358	BKFDCA13	Bakersfield Columbus	2.9042	2.5241	2.5797	2.4024	2.0747
661356	BKFDCA11	Bakersfield Empire	1.2892	2.1256	2.1910	0.8333	0.6625
661357	BKFDCA12	Bakersfield Main / Fairview	2.9881	2.4499	2.7698	2.2265	2.2352
661360	BKFDCA15	Bakersfield Mettler	-	-	0.0030	-	-
661409	BKFDCA19	Bakersfield Nomad	2.8454	1.4095	1.3947	1.9429	1.5933
661359	BKFDCA14	Bakersfield Temple	2.8525	3.3768	3.7034	1.9807	2.0395
949706	BALBCA01	Balboa	3.1280	2.8958	1.9871	1.7400	1.4311
805362	BYPKCA11	Baywood Park	2.6160	7.5306	4.6830	2.3493	2.3068
530431	BEALCA11	Beale	1.0204	2.1277	5.4167	0.5952	1.3889
209155	BVLYCA11	Bear Valley	5.7018	0.2273	0.1259	2.4465	1.4014
323604	BELLCA11	Bell	2.3602	2.4554	2.2047	1.8092	1.3949
831103	BNLMCA11	Ben Lomond	2.1378	0.5806	0.5313	1.0163	1.0071
707277	BNCICA11	Benicia	3.6227	6.2402	5.2594	2.1237	2.0721
510004	BKLYCA01	Berkeley/Bancroft	2.2492	2.3726	2.0278	1.3015	1.4939
925008	BTISCA11	Bethel Island	1.0083	2.7938	1.9514	0.9742	1.1386
310607	BVHLCA01	Beverly Hills	2.5350	4.5609	3.5038	1.5113	1.3543
530432	BGGSCA11	Biggs	4.3735	7.7320	5.4825	2.3810	3.1630
925082	BSRNCA70	Bishop Ranch	0.5169	0.6570	0.3454	0.4186	0.3585
831102	BLCKCA11	Boulder Creek	4.6460	0.3061	0.2357	2.3669	2.4044
760708	BRWLCA11	Brawley	2.6647	1.2874	0.8918	1.5438	1.4382
714709	BREACA12	Brea	2.9612	3.4844	3.8286	2.4220	2.1899
925007	BRWDCA12	Brentwood	4.3996	9.5513	6.1167	2.2513	2.3534
714789	SNANCA11	Bristol	2.6083	2.6041	3.0520	1.9435	1.8209
530434	BCWYCA11	Brockway	6.0706	2.4334	1.3361	1.6702	1.3725
714710	BNPKCA11	Buena Park	3.1339	4.9703	5.3531	2.2016	2.0047
818605	BRBNCA11	Burbank Palm	2.7631	3.2555	3.2270	1.9890	1.8286
818606	BRBNCA13	Burbank Thornton	0.2598	0.1084	0.0580	0.1416	0.2434

WC	CLLI	WC Name	2015	2016	2017	2018	2019
650006	BRLNCA01	Burlingame	2.7514	3.1063	2.6051	1.5444	1.6619
559242	BURLCA11	Burrell	1.1905	0.1302	0.1140	0.4154	0.1873
714788	SNANCA01	Bush	2.1790	3.5477	4.5392	1.8480	1.6153
818665	CLBSCA50	Calabasas / Los Virgenes	1.3078	0.8481	0.7161	0.9211	0.8455
818666	CLBSCA11	Calabasas / Park Sorrento	2.6099	3.7081	2.9844	1.9095	2.7387
760712	CLXCCA12	Calexico	4.0621	0.6254	0.4388	2.7933	2.0165
707282	CLSTCA11	Calistoga	3.2158	4.7276	3.9934	2.5070	2.8236
805364	CMBACA11	Cambria	2.5325	1.3586	0.9548	1.1299	1.2698
760714	CMPDCA01	Camp Pendleton	0.4496	0.4085	0.1901	0.1369	0.1098
818610	CNPKCA01	Canoga Park	2.6800	3.0754	3.2003	1.9257	1.8701
707327	UKIHCA12	Capella/Ivanhoe	55.5556	1.2691	0.7990	39.7436	27.0833
760716	CRLSCA11	Carlsbad Harding	3.5324	4.4051	5.2503	2.9764	2.7155
760717	CRLSCA12	Carlsbad La Costa	3.3015	3.5897	3.2795	2.4075	2.3041
831105	CRMLCA11	Carmel Main	6.3922	2.3748	2.1077	2.0644	2.7009
831106	CRVYCA11	Carmel Valley	2.7433	2.1429	1.6949	1.5093	1.5636
408138	SNVACA01	Carrol / Sunnyvale	2.1527	2.0390	1.7683	1.3321	1.4683
559157	CRTHCA11	Caruthers	5.0989	1.7604	2.2319	2.3987	2.4909
661408	CSTCCA11	Castaic	2.1252	1.6847	1.5890	1.2727	1.3168
831107	CSVLCA11	Castroville	2.4155	0.6214	0.5859	1.5987	1.4556
805366	CYCSCA11	Cayucos	2.6774	4.8387	3.4459	1.1696	1.1939
530528	CNVYCA11	Central Valley	2.4922	0.1962	0.1555	1.2346	2.9785
310663	WLANCA01	Century City	5.1447	11.8227	9.0231	3.6257	3.2080
530438	CHICCA01	Chico Main	2.3498	3.6232	3.7811	1.5144	1.9637
559158	CHWCCA11	Chowchilla	2.3139	0.3779	0.3231	1.9845	1.4957
619719	CHVSCA12	Chula Vista Apache	1.9701	2.4248	2.6666	1.7191	1.4625
619718	CHVSCA11	Chula Vista Third Avenue	2.4518	4.2811	5.9444	1.9781	1.8169
925081	CYTNCA11	Clayton	2.3484	4.2465	3.4247	1.9629	1.9322
707283	CLOKCA11	Clear Lake Oaks	4.9858	0.6213	0.6280	2.7689	1.9841
707284	CODLCA11	Cloverdale	2.6198	2.1328	2.0757	2.1876	2.1554
559159	CLVSCA11	Clovis	2.0692	3.4815	3.4756	1.4055	1.3818
559160	CLNGCA01	Coalinga	3.0039	0.9446	0.8261	2.3795	1.5801
707285	CBMTCA11	Cobb Mountain	-	-	0.7261	1.2579	2.8000
650010	COLACA01	Colma-Daly City	2.7315	4.4827	4.0862	1.6823	1.8017
909720	COTNCA11	Colton	2.3860	0.7339	0.7627	1.5950	1.4463
310609	CMTNCA01	Compton	3.5837	6.6205	6.0525	2.2683	2.6143
925009	CNCRCA01	Concord	2.5248	1.8797	1.7756	1.6937	1.7181
707286	CORDCA12	Cordelia	0.8272	0.3985	0.2303	0.7570	0.7558
530440	CRNGCA12	Corning	2.7126	1.2828	1.1478	1.5222	2.1997
951721	CORNCA11	Corona	2.7218	4.3886	4.4137	1.8221	1.6170
949722	CRDMCA11	Corona Del Mar	2.2067	4.6211	3.2440	1.4783	1.0371
619723	CRNDCA11	Coronado	2.5937	2.5785	2.2237	1.5152	1.5507
949725	CSMSCA11	Costa Mesa	3.1743	4.8730	6.0488	2.2794	2.1954
707287	CTTICA12	Cotati	2.8297	4.3426	3.5993	1.8821	1.9433
530441	CTWDCA11	Cottonwood	10.7914	9.9483	8.1425	5.8642	7.3826
510011	CRCTCA02	Crockett	2.3689	0.1250	0.1578	1.7806	1.0903
209162	CWLDCA12	Crows Landing	2.0000	0.8013	0.4237	1.6026	1.7361
310608	CLCYCA11	Culver City	2.7233	4.6046	3.9913	1.9188	1.9430
925085	DAVLCA13	Danville - Tassajara (13)	2.6919	1.6478	1.5870	1.6979	1.7967
925012	DAVLCA12	Danville-Main (12)	3.1780	4.6858	3.8803	1.8033	1.6291
530442	DAVSCA11	Davis	2.5788	3.0371	2.4723	1.3579	1.3283
858727	DLMRCA12	Del Mar	2.7915	3.5072	3.5186	1.8218	1.6850
559163	DLRYCA11	Del Rey	5.0725	0.1182	0.0937	2.8249	2.2569
661367	DELNCA11	Delano	3.8899	2.1273	1.9177	2.0926	1.8588
559164	DINBCA01	Dinuba	3.0996	1.9269	1.3099	1.6354	1.6031
707443	DIXNCA11	Dixon	1.9154	2.3529	1.9307	1.0376	1.1912
619728	DLZRCA11	Dulzura	3.1073	2.1667	1.8519	4.2735	2.1807
530445	DNGNCA12	Dunnigan	14.1667	10.4167	3.1250	2.7778	3.3198
530446	DNSMCA11	Dunsmuir	1.7720	2.5107	1.5931	0.7357	0.6897
661368	ERLMCA11	Earlimart	10.4361	0.4624	0.3686	3.1020	2.8852
916478	NHLDCA11	Edgewood/N. Highl	2.3440	3.5494	4.2478	1.6556	1.5915
661369	EDWRCA01	Edwards	0.2874	0.0507	-	3.5088	-
619729	ELCJCA11	El Cajon	2.6677	4.4964	5.1961	2.0260	1.9709
760730	ELCNCA01	El Centro	2.2599	1.3834	1.2712	1.8268	1.4279

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626611	ELMNCA01	El Monte	2.2137	2.7778	2.5280	1.2122	1.3013
310613	ELSGCA12	El Segundo Douglas	6.1510	1.6903	1.4203	3.4174	3.5019
949731	ELTRCA11	El Toro	1.7955	2.9637	3.0074	1.1753	1.2567
760732	ENCTCA12	Encinitas	2.1523	1.7935	1.7295	1.4898	1.4088
209192	ESCLCA11	Escalon	1.3366	2.5503	1.6039	0.9076	0.7748
760733	ESCNCA01	Escondido	2.1875	3.1135	3.8503	1.8984	1.8182
530450	ESPRCA11	Esparto	1.6266	0.2776	0.1463	0.8533	1.1377
714739	GRGVCA01	Euclid	2.8033	1.8064	1.9031	1.8877	1.8285
707289	EURKCA01	Eureka	2.3246	2.4115	2.2983	1.4396	1.0824
661383	OLDLCA11	Export / Oildale	2.2686	4.1783	4.4075	1.6556	1.6011
916451	FROKCA11	Fair Oaks	2.5822	3.1914	2.9569	1.6049	1.5115
707290	FRFDCA01	Fairfield	2.1911	3.9600	3.7730	1.4447	1.5472
760735	FLBKCA12	Fallbrook	2.7826	4.2298	4.2804	2.3031	1.9985
559165	FRVLCA11	Farmersville	3.2282	1.6308	1.1840	2.2698	1.6867
831108	FETNCA11	Felton	1.6010	1.2876	0.8100	0.9816	1.1986
805370	FLMRCA11	Fillmore	2.4399	0.8264	0.5693	1.1710	1.5109
559166	FRBHCA11	Firebaugh	2.9345	0.1792	0.1204	1.6143	1.0687
916536	FLSMCA14	Folsom - Blue Ravine	3.7537	2.0880	1.9916	2.4296	2.2910
916454	FLSMCA13	Folsom - El Dorado Hills	2.7846	2.3522	2.0794	1.6165	1.7009
916453	FLSMCA12	Folsom - Nimbus	1.3641	1.9949	1.8774	1.0045	0.7716
909736	FNTACA11	Fontana	2.7433	4.5333	4.7254	2.1014	2.0195
707291	FSVLCA11	Forestville	6.9106	3.5088	2.2377	2.4848	3.0362
707292	FTBRCA02	Fort Bragg	2.3906	3.9311	2.3013	1.0753	1.1021
707293	FTUNCA11	Fortuna	3.9837	1.5985	1.1954	2.6723	3.1447
510015	FRMTCA12	Fremont Adams (Oliver12)	2.3258	1.4156	1.2898	1.5795	1.5079
510014	FRMTCA11	Fremont Main 11	1.9900	3.6189	3.2713	1.2468	1.3121
559169	FRSNCA11	Fresno Baldwin	3.0708	3.1195	3.2960	1.9028	1.8677
559172	FRSNCA12	Fresno Clinton	2.2741	1.7554	2.0195	1.7138	1.4313
559168	FRSNCA01	Fresno Main	3.4476	1.3102	1.3644	2.9851	2.6569
559170	FRSNCA13	Fresno Sierra	3.0218	2.8435	2.9652	2.0130	2.1391
559245	FRSNCA14	Fresno West / Highway City	3.8419	2.4271	2.3487	2.5999	2.4444
559247	FRSNCA15	Fresno Woodward	2.9494	2.0956	1.7923	1.9735	2.0342
916519	WSCRCA11	Frontier	2.1275	4.5510	2.9882	1.3913	1.2730
714737	FUTNCA01	Fullerton	2.0403	3.7517	4.2030	1.5778	1.5289
209171	GALTCA11	Galt	2.5993	0.6034	0.5967	1.3312	1.3629
310615	GRDNCA01	Gardena	2.8506	5.2302	4.4921	1.7766	1.8603
858762	PCBHCA01	Garnet	2.1724	2.8845	5.0604	2.1355	1.9942
530457	GRTWCA11	Georgetown	-	-	-	-	7.7381
707294	GYVLCA11	Geyersville	4.4554	1.0309	0.6068	1.6892	1.6092
818614	GLDLCA11	Glendale	2.2804	3.1980	3.1951	1.5893	1.6418
831121	SLNSCA12	Glenview	0.5933	0.1126	0.0888	0.3079	0.4363
831110	GNZLCA11	Gonzales	5.1423	2.2652	1.5205	1.5784	1.2104
530459	GRVYCA01	Grass Valley	2.8326	6.2367	4.2630	2.1596	2.3629
831109	GNFDCA11	Green Field	3.4173	0.4554	0.3145	2.2975	1.9794
530461	GRDLCA11	Gridley	1.9617	2.6920	1.8798	1.5198	1.0252
707296	GUVLCA11	Guerneville	1.6667	1.0593	0.6732	0.7793	0.8082
209174	GUSTCA11	Gustine	2.5466	2.4231	1.9372	1.8079	2.1281
714809	YRLNCA12	Gypsum Canyon	1.7914	0.4765	0.4655	1.0400	1.3779
650016	HMBACA12	Half Moon Bay	7.5933	0.8649	0.7233	4.8426	4.4872
530462	HMCYCA11	Hamilton City	7.6923	1.6869	0.6270	1.2066	1.8883
559175	HNFRCA01	Hanford	2.4349	3.3136	3.3599	1.5302	1.6590
310618	HWTHCA01	Hawthorne	3.2617	5.9044	5.7559	2.1957	2.1784
510018	HYWRCA11	Hayward Depot	2.2533	1.3920	1.2879	1.4344	1.4054
510017	HYWRCA01	Hayward Main	2.1637	3.1121	2.5956	1.3028	1.2858
707297	HLBGCA11	Healdsburg	1.1238	1.8606	1.4321	0.8278	1.1516
209176	HERLCA11	Herald	3.1061	5.6995	4.2929	3.1111	1.5707
510080	HRCLCA11	Hercules-Pinole	2.1467	1.7022	1.5449	1.2467	1.2538
831120	SLNSCA11	Hickory/Salinas	1.8930	1.4975	1.4580	0.9979	1.0597
909741	HGLDCA11	Highland	2.8641	5.6143	5.3577	1.8903	1.6607
831111	HLSTCA11	Hollister	2.2557	2.7074	2.2815	1.3488	1.1474
323616	HLWDCA01	Hollywood	2.3524	3.6353	3.8853	1.5985	1.5921
760742	HLVLCA11	Holtville	2.6831	0.6247	0.6052	0.9989	1.3005
530463	HMWDCA11	Homewood	9.4136	8.2902	4.3981	1.5516	1.6453

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858763	PCBHCA11	Hornblend	4.1965	0.9241	0.7765	3.6089	4.1667
209177	HGSNCA11	Hughson	2.8036	0.6450	0.7392	1.4895	1.7014
831122	SLNSCA13	Hunter	4.9197	4.4554	4.1922	2.4721	4.6595
323617	HNPKCA01	Huntington Park	2.7342	2.8869	3.0856	1.9494	1.7254
559178	HURNCA11	Huron	30.1724	0.6615	0.5070	5.6452	3.7367
415019	IGNCCA12	Ignacio	2.8129	1.1051	0.8348	1.2481	1.7720
760743	IMPRCA11	Imperial	1.3366	0.9383	0.5923	1.1529	1.0220
619744	IMBHCA11	Imperial Beach	3.0686	1.5365	2.0325	3.0105	2.7230
310619	IGWDCA01	Inglewood	2.8770	4.1028	3.7643	1.7934	1.8625
415020	INVRCA11	Inverness	6.1056	1.1946	0.7857	1.4159	0.7389
209179	IONECA11	Ione	27.4510	11.5661	9.3210	14.1534	14.0673
949745	IRVNCA01	Irvine	2.9483	4.8527	5.7107	2.3342	1.9185
949807	IRVNCA11	Irvine/Airport	0.4332	0.6901	0.8429	0.7429	0.7691
559180	IVNHCA11	Ivanhoe	3.0262	3.4388	3.4871	3.3011	1.9380
209181	JCSNCA01	Jackson	1.7954	3.3229	1.6946	1.0336	0.9438
209182	JMTWCA11	Jamestown	61.3636	1.4056	1.7361	50.6944	48.0769
619851	JAMLCA60	Jamul	9.3333	2.3592	2.0619	5.3977	5.1454
760748	JULNCA12	Julian	1.7296	2.8761	1.6177	0.8405	1.0170
831112	KGCYCA11	King City	2.9634	2.3229	1.6784	1.8519	1.3372
559183	KGBGCA11	Kingsburg	3.2738	2.1280	2.0277	1.9439	1.7767
530465	KYBRCA11	Kyburz	0.5255	0.3497	0.3504	0.4301	0.4902
818621	LACRCA11	La Crescenta	3.0773	6.2458	4.4163	1.6700	1.7579
858750	LAJLCA11	La Jolla / Girard	3.6863	1.7816	1.8437	2.6450	2.4646
619752	LAMSCA01	La Mesa	2.0046	2.8021	3.4299	1.7271	1.6005
925022	LFYTCA11	Lafayette	2.5409	5.6807	4.6351	1.6080	1.6056
209185	LGRNCA12	LaGrande/D Pedro	2.0115	1.3725	1.5344	1.1261	1.6917
949749	LGNCA12	Laguna Niguel	2.5246	3.7203	4.3388	2.0008	1.8021
661405	LKLACA11	Lake Los Angeles	1.5625	2.2380	2.2342	1.2950	1.2219
530532	GRVYCA11	Lake of the Pine	6.1863	1.2320	0.7734	4.0918	6.0155
707302	LKPTCA02	Lakeport	1.9546	2.3271	1.6706	1.4213	1.4378
619751	LKSDCA12	Lakeside	2.1544	2.5304	3.0789	1.5132	1.5295
661372	LAMTCA11	Lamont	4.1330	0.6314	0.4860	2.8295	1.9362
415023	LRKSCA11	Larkspur/Corte Madera	3.4734	1.3242	0.9789	1.8456	1.9827
209187	LGRDCA11	Le Grande	4.1414	0.1752	0.1270	1.0281	1.4093
661373	LEBCCA11	Lebec	2.6723	2.0582	1.9315	1.0832	1.5686
559188	LEMRC A11	Lemore Main	3.1052	3.6866	3.3951	1.9676	2.3939
559189	LEMRC A12	Lemore Wyman	4.1667	0.1104	0.1062	0.3058	0.1667
661374	LNVC A11	Leona Valley	0.9460	0.5767	0.5479	1.0772	0.5117
916467	LNCLCA11	Lincoln	1.9390	2.8896	3.0851	1.3593	1.4986
661375	LTRKCA11	Little Rock	13.8889	3.1926	3.0193	4.4974	4.0682
530468	LVOKCA11	Live Oak	2.8307	0.2864	0.3102	1.9966	1.9012
925025	LVMRCA11	Livermore	2.0513	4.1405	3.1573	1.1557	1.2219
209190	LCFRCA11	Lockeford	6.1192	1.5657	1.4453	2.8752	3.4772
209191	LODICA01	Lodi	2.1945	3.6993	3.0605	1.2441	1.3844
707303	LOLTCA11	Lolita	0.4386	0.0351	0.0244	0.0998	0.1623
310622	LOMTCA11	Lomita	3.2952	5.7256	4.6210	2.0710	2.1263
916470	LOMSCA11	Loomis	5.8678	9.2124	5.6872	3.9692	3.4166
707319	SNRSCA11	Los Alamos	2.4579	1.1769	0.9960	1.3127	1.3829
650024	LSATCA11	Los Altos	8.1980	2.9777	2.4701	5.2508	5.6520
209193	LSBNCA12	Los Banos	2.2780	2.9351	2.1350	1.3295	1.2908
530469	LSMLCA11	Los Molinos	7.2581	1.1356	1.3417	2.9750	2.7217
707304	LWLKCA11	Lower Lake	3.5262	4.1140	2.6265	1.4414	2.3766
323635	LSANCA14	LSAN Adams	2.6703	1.7304	1.6790	1.8191	1.8059
310628	LSANCA07	LSAN Airport	2.7886	3.3293	3.2491	1.6569	1.8553
323641	LSANCA34	LSAN Angeles	2.8612	3.8775	4.2006	2.2471	1.9929
323636	LSANCA15	LSAN Axminster	4.2188	5.2498	4.1942	2.3090	2.4664
323638	LSANCA23	LSAN Capitol	2.4504	1.4099	1.4173	2.0553	1.8302
323644	LSANCA56	LSAN Clinton	3.0318	2.5750	2.2996	2.1157	2.0150
323629	LSANCA08	LSAN Melrose	2.2849	2.2551	2.4751	1.5901	1.3991
323642	LSANCA35	LSAN Montebello	2.5944	2.4484	2.7225	1.7955	1.8062
323626	LSANCA05	LSAN Pleasant	3.7100	6.2463	5.6180	2.7342	2.4665
323634	LSANCA13	LSAN Plymouth	4.4356	4.5219	3.8991	2.9222	3.1129
323643	LSANCA38	LSAN Republic	2.3126	2.1737	2.1736	1.7663	1.5613

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323640	LSANCA29	LSAN Sunset	2.0781	1.4105	1.7741	1.9584	1.8747
323631	LSANCA10	LSAN Webster	3.1835	4.6821	4.5863	2.3412	2.1171
559243	MADRCA12	Madera Bonnadelli	0.5840	0.3711	0.3018	0.4600	0.5242
559194	MADRCA11	Madera Main	2.5220	2.9900	2.7370	1.6479	1.4583
213624	LSANCA02	Madison 02 / MO	2.6790	2.5264	2.7214	2.0673	1.7255
213625	LSANCA03	Madison 03 / MA	1.4496	1.1309	1.6299	1.5485	1.3778
831113	MARNCA11	Marina	3.4878	2.7186	2.3758	2.2108	2.3591
925030	MRTZCA11	Martinez	2.4647	2.7901	2.5891	1.6405	1.8926
530472	MYVICA01	Marysville	2.3994	1.2427	1.1482	1.5778	1.6679
408139	SNVICA11	Mathilda / Sunneyvale	1.2302	0.3339	0.3986	0.9368	0.7618
707307	MKVLCA11	McKinleyville	2.2563	2.6961	2.4957	1.7530	1.9420
707305	MNDCCA11	Mendocino	7.2917	0.5483	0.2907	2.6190	1.7500
559195	MNDTCA11	Mendota	6.9630	7.4797	6.4957	4.9167	4.2914
650028	MNPKCA11	Menlo Park	5.3968	9.6552	6.7780	2.6273	3.3773
209196	MRCDA01	Merced	2.2977	3.0784	2.6335	1.2658	1.2907
707306	MDTWCA11	Middletown	4.1667	0.5618	0.4226	1.6926	1.7660
415027	MLVYCA01	Mill Valley	2.7888	1.3157	1.3816	1.5281	1.5954
650026	MLBRCA11	Millbrae	2.5565	4.2565	3.5714	1.5876	1.7892
408114	MLPSCA11	Milpitas	2.0524	2.4082	2.6941	1.2463	1.2707
949806	MSVJCAAT	Mission Viejo	2.9620	3.9342	4.9885	2.5329	2.8349
209200	MDSTCA03	Modesto Kellog / South / Ceres	2.6011	1.1233	1.1636	1.7718	1.7366
209201	MDSTCA04	Modesto Kingswood / Curtis / Salida	1.7433	1.1571	1.0213	0.9503	1.0449
209199	MDSTCA02	Modesto Main	3.3530	5.3422	4.9561	1.9667	1.9267
209248	MDSTCA05	Modesto Tally	0.8250	1.1093	0.9406	0.4875	0.4628
661376	MOJVCA01	Mojave	3.2520	1.5864	1.1246	4.1411	2.7222
530529	MTAGCA11	Montague	1.6484	0.5272	0.3912	0.4996	0.5855
831115	MTRYCA01	Monterey	2.8569	4.5769	3.7398	1.4741	1.7639
805377	MRPKCA12	Moorpark	2.8038	3.9565	3.5864	1.5721	1.3877
925029	MORGCA12	Moraga	3.6618	4.9612	3.4340	2.0889	2.4390
831123	SLNSCA14	Moro	40.6250	32.2917	26.3566	15.6069	13.2911
805378	MRBACA11	Morro Bay	1.0264	1.3572	1.0811	0.8284	0.7524
650031	MSBHCA11	Moss Beach	5.7800	0.5725	0.5488	1.6492	1.4737
530474	MTSHCA12	Mount Shasta	2.7653	0.5170	0.4916	1.3944	1.2126
650032	MTVWCA11	Mountain View	2.0629	4.0010	2.9296	1.2776	1.2197
209203	MRPHCA11	Murphys	5.7692	11.2121	6.8992	1.6628	2.7446
707310	NAPACA01	Napa	2.5038	3.4756	3.0804	1.6246	1.6734
619754	NTCYCA11	National City - Highland	2.3005	3.1798	3.3824	2.3925	2.0058
530475	NVCYCA11	Nevada City	4.5992	2.5071	2.5187	2.9862	3.9356
916476	NWCSCA11	Newcastle	3.6695	3.5282	2.8665	2.6031	2.9266
661379	NHLLCA01	Newhall	2.2822	2.3201	2.5606	1.6851	1.6380
209204	NWMNCA12	Newman	1.9042	2.5597	2.2393	1.5899	1.4268
818646	NHWDCA01	NHWD / Lankershim	2.3470	1.7403	1.9180	1.8498	1.8585
818647	NHWDCA02	NHWD / Magnolia	2.5622	2.7333	3.0606	1.9798	1.8557
707311	NICECA11	Nice	6.0811	0.2256	0.2659	2.5575	2.9810
530477	NCLSCA12	Nicolaus	0.1745	0.0313	0.0255	0.3844	0.2717
760855	NILDCA11	Niland Main	20.8333	2.1242	2.0408	10.7143	7.8431
805380	NIPMCA11	Nipomo	1.8097	2.4081	1.5598	1.1364	0.9498
323633	LSANCA12	Normandy	2.6774	2.3831	2.1330	1.7374	1.7693
916537	NSCRCA12	North Natomas	2.2817	1.4811	1.5997	1.6099	1.5166
530480	NSJNCA11	North San Juan	1.9809	0.1446	0.1420	0.7699	0.9497
818648	NORGCA11	Northridge	2.2244	3.9555	4.5980	1.7238	1.8395
209205	OKDLCA11	Oakdale	1.9115	2.4524	1.9750	1.2485	1.1846
510038	OKLDCA11	Oakland 45th/Olympic(Central)	2.7221	3.0998	2.8006	1.6219	1.8113
510036	OKLDCA03	Oakland Franklin	2.7956	2.8234	2.8673	2.0841	2.1037
510039	OKLDCA12	Oakland Holly	2.5552	3.3368	3.0076	1.8318	1.6757
510037	OKLDCA04	Oakland Kellog(Fruitvale)	3.5450	3.1053	3.3498	2.1497	1.9662
510040	OKLDCA13	Oakland Mountain	2.3503	1.6089	1.1372	1.2902	1.3462
925041	OKLYCA11	Oakley	2.1495	1.4346	1.2539	1.3104	1.3557
805381	OKVWCA11	Oakview	230.0000	0.5561	0.6193	46.1111	43.3333
760758	OCSDCA11	Oceanside / Mission	2.5803	3.8398	5.1882	2.0919	2.1158
805382	OJAICA11	Ojai	1.7958	0.7915	0.6999	1.4818	1.5596
714759	ORNGCA11	Orange Chapman	2.1212	4.0373	3.9813	1.5084	1.5073
559206	ORCVCA11	Orange Cove	4.1809	1.1413	0.8390	4.3651	2.7344

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714760	ORNGCA13	Orange Olive	3.1149	2.7907	2.4642	1.7836	1.7957
714761	ORNGCA14	Orange West	1.9802	1.1313	1.0812	1.9011	1.4980
916482	ORVACA11	Orangevale	1.3593	2.2251	1.5772	0.9819	0.8262
925042	ORNDCA11	Orinda	7.5758	2.2417	2.2017	5.3630	6.5292
530483	ORLDCA11	Orland	2.4120	3.0233	2.1376	1.3747	1.2753
559207	ORSICA11	Orosi	2.5978	1.6573	1.4906	2.1848	1.6514
530485	ORVLCA12	Oroville East	3.1934	3.0725	2.6370	1.7107	2.0015
530484	ORVLCA11	Oroville Main	3.5329	1.2110	1.0652	2.4675	2.2474
619853	OTMSCA11	Otay Mesa	1.4171	1.3908	1.8725	1.1168	1.4417
650043	PCFCCA11	Pacifica	3.5789	5.8721	5.1465	2.0769	2.2768
661384	PLDLCA01	Palmdale	2.7784	2.0134	1.8976	1.8495	1.7547
661412	PLDLCA11	Palmdale East / 47TH ST	1.7062	0.9479	0.8106	1.2329	1.1128
650045	PLALCA02	Palo Alto Main	2.1039	3.7707	3.1730	1.2444	1.2596
650046	PLALCA12	Palo Alto South	1.9355	1.0877	0.8073	0.9519	1.0208
530486	PRDSCA11	Paradise Main	4.6862	3.9327	3.8145	3.3839	3.7821
530487	PRDSCA12	Paradise Pines	3.1546	2.5362	2.2492	2.0531	3.9403
562649	PRMTCA01	Paramount	2.5005	3.9971	4.3580	1.7519	1.7915
415073	SNRFCA11	Parkway	2.0180	2.2373	1.7846	1.0486	1.0073
559208	PRLRCA11	Parlier	2.7151	1.4840	1.0309	3.0388	2.3638
626651	PSDNCA12	Pasadena / Lake	2.6626	3.1106	2.5662	1.6224	1.5540
626650	PSDNCA11	Pasadena / Mt Wilson / Green	2.2391	4.0005	3.6418	1.4636	1.4701
805385	PSRBCA01	Paso Robles	1.5224	0.1988	0.2249	0.9965	1.0820
760764	PALACA11	Pauma Valley	0.2402	0.1339	0.1376	0.1761	0.2281
951765	PDLYCA11	Pedley	1.7258	2.6613	2.9732	1.4123	1.2169
650051	PSCDCA11	Pescadero	4.0881	1.2416	1.0599	0.6138	0.9567
707314	PTLMCA01	Petaluma	2.3834	3.7748	2.9058	1.1691	1.3285
619766	PNVYCA11	Pine Valley	2.0276	2.2825	1.0973	1.0502	1.7043
805386	PIRUCA11	Piru	0.2051	0.0370	0.0406	0.0890	0.0717
805387	PSBHCA11	Pismo Beach	1.4130	0.5313	0.3971	1.1927	0.9783
925050	PSBGCA11	Pittsburg Bay Point / Willow	2.4943	1.7428	1.5208	1.7552	1.5841
925049	PSBGCA01	Pittsburg Main	2.5772	1.9811	2.0819	1.7105	1.8920
559210	PXLYCA11	Pixley	3.7398	4.9172	3.3790	2.2617	1.5734
714767	PLCNCA11	Placentia	2.4479	3.0900	3.3085	1.8143	1.6880
530489	PLVLCA11	Placerville - Main	2.7573	4.7975	3.8657	1.9983	2.6260
530490	PLVLCA12	Placerville - Niagara	6.2281	1.8660	1.7862	5.9361	5.9354
925083	PLTNCA13	Pleasanton Hacienda	0.2673	0.1468	0.1546	0.4234	0.5081
925047	PLTNCA12	Pleasanton Main/Hopyard	2.4403	5.2421	4.7065	1.6179	1.5277
209212	PLMOCA11	Plymouth	8.7838	0.4604	0.4210	1.4460	2.8180
559213	PTVLCA11	Porterville	3.0097	1.5229	1.1163	1.5269	1.5753
858768	POWYCA11	Poway Midland	2.4891	3.5182	3.9941	2.4676	2.6966
949808	RSMGCA11	R. S. Margarita	2.2222	3.0671	3.2490	1.5311	1.4322
760769	RAMNCA11	Ramona	2.6667	3.4748	2.9666	1.4621	1.5704
213632	LSANCA11	Rampart	1.8541	1.5944	1.5728	1.4369	1.4064
858770	RBRNCA11	Rancho Bernardo	1.6158	2.1339	2.4353	1.3479	1.1779
858854	RNPSCA11	Rancho Penasquitos	2.0823	1.3409	1.1506	1.3600	1.3607
619852	RNSDCA11	Rancho San Diego	1.7808	1.0781	1.4856	1.5524	1.4521
858771	RSFECA12	Rancho Santa Fe	23.3524	4.5949	3.6024	3.7313	3.4813
530494	RDBLCA01	Red Bluff	2.3137	0.6026	0.4967	1.4157	1.6559
530531	RDNGCA11	Redding Enterpr	2.3414	1.5550	1.9394	1.7234	1.7973
530495	RDNGCA02	Redding Main	4.6916	1.0138	1.2480	3.2771	3.2985
650053	RDCYCA01	Redwood City	2.7092	4.0360	3.3590	1.5504	1.6969
818652	RESDCA01	Reseda	3.2743	4.6313	4.7893	2.2188	2.2057
909773	RILTCA11	Rialto	3.3765	4.5837	5.1956	2.6305	2.2036
510013	ELSBKA11	Rich-Appian Way/EI Sobrante	2.9821	2.9540	2.4601	2.0956	2.0963
213630	LSANCA09	Richmond	3.0935	1.2548	1.2942	2.4959	2.5136
510052	RCMDCA11	Richmond-SF	2.9454	4.8265	4.4597	2.0685	1.8405
707317	RIDECA11	Rio Dell	2.0440	0.1483	0.1158	2.1318	1.8672
916526	RILNCA12	Rio Linda	1.3330	2.2482	2.6865	1.4186	1.1775
209214	RVRBCA11	Riverbank	4.3754	5.8366	4.4955	2.1221	2.2440
559215	RVDLCA11	Riverdale	2.2388	0.5283	0.4376	1.3040	1.3499
951774	RVSDCA01	Riverside Orange	2.3274	3.3851	4.1231	1.8064	1.6657
916527	RCKLCA11	Rocklin	3.0819	0.8328	0.7448	2.0304	1.7897
707337	RTPKCA11	Rohnert Park	2.6204	1.4365	1.0106	1.5556	1.7553

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661388	RSMUCA11	Rosamond	2.8031	3.4400	2.5546	2.3129	2.3736
626654	ROSMCA11	Rosemead	2.6221	2.8947	2.5955	1.7071	1.6180
949791	SJCPCA12	S. J. Capistrano	3.0789	0.9814	1.0672	2.4862	2.2891
916497	SCRMCA01	Sacramento Mn	1.6282	2.0316	1.9806	1.1096	1.1182
831119	SLNSCA01	Salinas Main	2.3416	1.9530	1.6484	1.2426	1.2977
650055	SNBUCA02	San Bruno	2.4826	3.5501	2.8250	1.4993	1.4886
650056	SNCRCA11	San Carlos	1.9810	2.4332	2.0072	0.9894	1.1370
949776	SNCLCA12	San Clemente	2.5595	0.9225	0.9500	1.5071	1.8212
626658	SNGBCA01	San Gabriel	3.9091	6.4411	5.5220	2.2278	2.4099
408134	SNJSCA18	San Jose Almaden Valley	3.3366	2.1961	1.8024	1.7064	1.7052
408131	SNJSCA13	San Jose Chynoweth	2.6411	2.3837	2.1983	1.6870	1.6877
408130	SNJSCA12	San Jose Dial Way	2.8417	2.8012	2.4469	1.8150	1.9472
408133	SNJSCA15	San Jose Evergreen / San Felipe	2.9145	1.2788	1.1708	1.5638	1.7159
408132	SNJSCA14	San Jose Foxworthy	2.1583	2.4088	2.2503	1.4529	1.4320
408145	SNJSCA21	San Jose Junction	2.3077	0.8607	1.0957	2.7646	2.4724
408128	SNJSCA02	San Jose Main	1.7280	3.3098	3.4344	1.3603	1.3437
408129	SNJSCA11	San Jose White Rd	2.2301	2.2993	2.2096	1.3973	1.3619
831127	SNJNCA11	San Juan Baustista	1.6213	0.1786	0.2342	0.4770	0.6346
510070	SNLNCA11	San Leandro	3.1534	6.2257	4.6092	1.8714	1.9491
805389	SNLOCA01	San Luis Obispo	1.2253	0.2968	0.2624	0.9991	0.6289
408136	SNMACA11	San Martin	2.5463	1.7519	2.5706	2.4760	1.9936
650071	SNMTCA11	San Mateo	2.6069	5.2134	4.0674	1.5633	1.5324
310659	SNPDCA01	San Pedro	2.8820	2.3220	2.3146	2.1046	1.9306
415072	SNRFCA01	San Rafael Main	4.4239	5.3547	4.5787	2.6124	2.8376
925074	SNRMCA11	San Ramon	2.4964	2.7778	2.7996	1.5604	1.5471
619794	SNYSCA12	San Ysidro	2.9188	3.1983	3.6867	2.5768	2.5829
714804	SNANCA12	Santa Ana West / SNAN Bolsa	2.3612	1.1992	1.2929	2.0373	2.0498
408137	SNTCCA11	Santa Clara Bellomy	2.2532	4.0698	3.6359	1.5120	1.5777
408143	SNTCCA01	Santa Clara Spacepark	1.3446	0.6894	0.5454	1.4609	1.3602
831125	SNCZCA01	Santa Cruz	4.0715	1.6450	1.3516	2.3187	1.8291
831126	SNCZCA11	Santa Cruz-Capitola	2.4063	2.9057	2.5324	1.3460	1.2154
707320	SNRSCA01	Santa Rosa Main	2.4572	3.4179	2.9725	1.4494	1.5022
619795	SANTCA01	Santee	1.6966	1.1663	1.4856	1.4902	1.3365
805391	SATCCA12	Saticoy	2.2473	1.1788	1.2190	1.4075	1.5135
661407	SAGSCA11	Saugus	2.3266	2.4076	2.3359	1.4700	1.4869
415075	SSLTCA11	Sausalito Larkspur	2.5241	1.3757	1.0707	1.5483	1.8574
831116	SCVYCA01	Scotts Valley	2.9004	1.4604	1.5540	2.0157	1.9706
916501	SCRMCA12	SCR - Empire	2.7555	2.4997	2.4258	1.7558	1.7739
916502	SCRMCA13	SCR - Fruitridge	3.2277	1.5817	1.5290	1.9900	1.9070
916499	SCRMCA03	SCR - Garden	2.9052	3.0473	2.9795	1.8642	1.9413
916500	SCRMCA11	SCR - Gladstone	2.3374	1.3464	1.5012	1.6032	1.6059
916498	SCRMCA02	SCR - Ivanhoe	3.0881	3.9575	3.7875	2.1370	2.0807
831117	SESDCA11	Seaside	1.9195	2.6222	2.6975	1.3457	1.2294
707321	SBSTCA11	Sebastapol	3.4957	2.6683	2.3404	1.8460	1.8082
559217	SELMCA11	Selma	3.4281	5.9976	4.4218	1.8095	1.6882
415058	SNFCCA01	SF Bush Pine	1.5271	0.7291	0.7580	1.4132	1.1394
415064	SNFCCA13	SF Evergreen-9th Ave	2.9390	1.5586	1.3208	1.5425	1.5855
415068	SNFCCA21	SF Folsom	1.5208	1.2366	1.4405	1.2764	1.4521
415061	SNFCCA06	SF Juniper-Onondaga	2.8480	3.4349	2.7624	1.5635	1.5367
415067	SNFCCA12	SF Larkin-Steiner	2.5301	2.0752	1.9416	1.4558	1.4319
415059	SNFCCA04	SF Market-McCoppin	1.9946	2.4557	1.9608	1.1210	1.2558
415060	SNFCCA05	SF Mission-25th St	2.8447	2.7087	2.0563	1.4208	1.3918
415065	SNFCCA14	SF Montrose-19th	2.1495	3.1697	2.5157	1.1960	1.2757
415066	SNFCCA17	SF Third St.	2.4093	1.0762	1.0383	1.4436	1.4167
661392	SHFTCA11	Shafter	4.1543	1.2672	0.9342	2.2869	2.4161
818656	SHOKCA01	Sherman Oaks	3.0725	5.1219	4.9896	2.0650	2.0781
530504	SGSPCA11	Shingle Springs	2.2901	2.0358	1.7374	1.2276	1.3637
714797	SLVRCA11	Silverado	6.5217	1.8987	1.9928	0.4065	1.1111
805393	SIMICA11	Simi	2.4725	2.9614	2.6445	1.6514	1.6400
530507	SMAVCA11	Smartsville	3.8462	4.3333	2.5463	1.7544	2.0599
619781	SNDGCA06	SNDG 37th Street	1.3323	1.4175	1.9701	1.5649	1.5712
619777	SNDGCA01	SNDG C Street	1.5683	1.5749	2.3934	1.7776	1.7535
619782	SNDGCA11	SNDG College	2.0923	1.7409	1.9839	1.7841	1.8417

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858779	SNDGCA03	SNDG Linda Vista	1.8707	2.2106	3.1126	1.8723	1.6690
619783	SNDGCA12	SNDG Market Street	3.2049	2.9336	3.3725	2.3639	2.3319
858786	SNDGCA16	SNDG Mira Mesa	1.6002	1.9150	2.2284	1.4595	1.4620
858785	SNDGCA15	SNDG Regents	1.3949	1.3518	2.3953	1.4798	1.6730
619780	SNDGCA05	SNDG Saipan	2.4439	1.7372	2.0261	2.2854	1.8186
619784	SNDGCA14	SNDG Tennyson	2.2091	1.8343	2.1536	1.9142	1.7767
619778	SNDGCA02	SNDG University	1.5072	1.6020	2.3370	1.5787	1.5837
530508	SDSPCA11	Soda Springs	37.5000	1.7266	3.4033	4.4365	9.9483
831118	SLDDCA11	Soledad	3.4680	1.7652	1.2225	2.1673	1.6066
661394	SLMNCA11	Solemint	2.2966	3.4209	3.6127	1.8436	1.6748
707323	SONMCA12	Sonoma	3.0610	3.9092	2.8299	1.5708	1.8091
209218	SNRACA13	Sonora	2.0522	0.6187	0.7356	1.3100	1.4331
626660	SPSDCA11	Sout Pasadena / Mission	2.4793	2.1003	1.9429	1.7823	1.5788
323655	SGATCA01	South Gate	2.4052	2.8999	2.6723	1.8663	1.5379
530512	STAHCA13	South Tahoe - Meyers/Apache	3.6731	5.9464	3.4216	1.7188	1.6529
530509	STAHCA01	South Tahoe - Sussex	3.1100	2.0174	1.7450	1.6134	1.5516
530511	STAHCA12	South Tahoe - Tamarack	7.8431	0.0825	0.5719	3.9683	2.0833
949810	IRVNCA12	Spectrum-Irvine	0.7246	0.3027	0.3092	0.8254	1.5374
707318	STHNCA11	St. Helena	2.9630	1.9918	1.7045	1.8182	2.1565
916541	RCKLCA01	Stanford Ranch	2.5596	2.9899	2.2320	1.4133	1.3692
415076	STBHCA11	Stinson Beach	6.2706	2.2135	1.2917	1.4607	1.2149
209222	SKTNCA12	Stockton Ashley	0.5143	0.1946	0.1593	0.5387	0.4650
209221	SKTNCA11	Stockton Granite	3.3775	3.5187	3.2733	2.0942	2.1362
209220	SKTNCA01	Stockton Main	2.9568	3.5500	3.8666	1.9903	2.0435
209223	SKTNCA14	Stockton Redwood	2.3226	2.2181	1.9909	1.2119	1.4051
707324	SUISCA11	Suisun City	5.5000	2.1404	2.5337	10.3801	5.6122
209225	STCKCA11	Sutter Creek	2.0871	2.0013	1.7352	0.9737	1.2674
530514	THCYCA01	Tahoe City	3.0303	0.4953	0.4024	0.8667	1.4039
661395	THCHCA01	Techachapi	1.4589	2.1960	1.8015	0.9031	0.8628
805396	TMTNCA11	Templeton	1.8217	3.1046	2.0337	1.0069	0.9402
209227	THTNCA11	Thornton	3.6667	1.5625	1.1715	2.7778	2.0261
415005	TBRNCA11	Tiburon	1.4701	2.6081	2.4987	0.8318	0.8884
559229	TPTNCA11	Tipton	6.5041	1.8886	2.1036	2.6797	2.8287
310661	TRNCCA11	Torrance	2.5104	1.8633	1.6222	1.4868	1.4610
209230	TRACCA11	Tracy	2.3140	4.3989	4.2744	1.6779	1.6716
530515	TRUCCA11	Truckee	3.0571	4.3438	2.9014	0.6920	0.7364
559231	TULRCA11	Tulare	2.4953	2.8318	2.7709	1.5512	1.5502
209232	TRLCCA11	Turlock	2.1860	1.9971	1.8523	1.4102	1.4642
714798	TUSTCA11	Tustin 11	2.7458	3.3345	2.9100	1.6217	1.6672
209233	TWHRCA11	Twain Harte	4.9338	0.4140	0.4751	2.2499	2.7339
707328	UKIHCA01	Ukiah Main	2.8616	3.5404	3.1393	2.2047	2.0654
213627	LSANCA06	Union	2.2226	1.0791	1.1792	1.7734	2.0532
510078	UNCYCA11	Union City	3.0475	5.5085	5.0890	2.0457	2.0769
707329	UPLKCA11	Upper Lake	4.2181	0.2363	0.1349	1.9608	1.4610
707330	VCVLCA12	Vacaville	2.3166	4.0782	3.9238	1.4684	1.5585
707331	VLLJCA01	Vallejo	2.5969	3.5738	3.3715	1.6177	1.5726
760799	VLCTCA11	Valley Center	3.3358	1.1158	1.1587	2.0823	1.8296
818662	VNNYCA02	Van Nuys	2.5276	2.0072	2.1176	1.8926	1.9086
805400	VNTRCA02	Ventura / Fir	2.5298	0.5776	0.5502	1.6618	1.5847
805399	VNTRCA11	Ventura Main / Montalvo	2.6245	2.6698	2.3964	1.7538	1.5310
559235	VISLCA11	Visalia Main	2.3969	2.3205	2.2802	1.5424	1.5087
760800	VISTCA12	Vista	1.7486	1.7201	2.3789	1.6657	1.6439
916479	NSCRCA11	Wabash	2.2147	1.8029	1.8912	1.7191	1.6523
209236	WLLCCA11	Wallace	2.6749	5.2846	4.3956	0.5618	1.7276
925079	WNCKCA11	Walnut Creek	2.2504	4.2465	3.2666	1.3546	1.4139
661402	WASCCA01	Wasco	1.8137	1.3567	1.1015	1.5577	1.3277
209237	WTFRCA11	Waterford	2.6649	0.7151	0.5673	2.3327	1.7166
831141	WTVLCA01	Watsonville	2.1524	3.9264	3.1558	1.1442	1.1165
530518	WEEDCA01	Weed	2.4390	1.3759	1.4008	1.0391	1.4572
530520	WTLDCA12	Wheatland	0.6233	0.7850	0.3184	0.3911	0.3865
530535	GRVYCA12	Wildwood	3.3589	4.5066	3.1382	1.4468	1.7400
707334	WLTSCA12	Willits	2.1318	0.3994	0.2774	1.2572	1.8639
530521	WLWSCA11	Willows	2.8238	2.8944	1.5930	1.6719	1.5758

WC	CLLI	WC Name	2015	2016	2017	2018	2019
310664	WLMGCA01	Wilmington	3.0155	5.5724	5.4624	1.8096	1.8425
707335	WNDSCA11	Windsor	3.0382	1.1391	0.8487	1.7639	1.5436
530522	WNTRCA11	Winters	10.8527	8.1317	5.4688	6.3079	4.6261
951775	RVSDCA11	Woodcrest	2.9805	1.7808	1.3750	1.7040	1.6339
559239	WDLKCA11	Woodlake	4.7000	0.6897	0.6582	3.7704	2.1050
530523	WDLCA11	Woodland	2.5990	3.9826	3.3354	1.5339	1.6142
714802	YRLNCA11	Yorba Linda	2.3013	4.2539	3.3531	1.3552	1.4133
707336	YNVLCA11	Yountville	3.1308	0.1758	0.1832	1.6534	1.9201
530524	YREKCA11	Yreka	1.8430	3.2062	1.8905	1.4768	1.4477
530525	YBCYCA01	Yuba City / Marysville	2.1336	1.4592	1.3664	1.3578	1.4174

VoIP service quality metrics: Frontier California

On the day it took over control of the California ILEC from Verizon, Frontier California had [REDACTED] VoIP lines in service. By the end of December 2019, that number had decreased to [REDACTED], a roughly 50% erosion in the number of VoIP subscribers between the April 1, 2016 acquisition date and December 31, 2019. Not all of Frontier's VoIP customers were being served out of *FiOS*-equipped locations,¹⁰⁴ although the precise breakdown has not been provided. As of the acquisition date (April 1, 2016), Frontier was providing *FiOS* services in approximately 75 of its 201 reporting units (which, as discussed in Chapter 4F above, in some cases represented administrative consolidations of two or more individual wire centers) although there were fewer than 10 VoIP lines in five of these; by the end of 2019, the number of reporting units where *FiOS* was being provided had decreased to 68. Frontier states that, as of October 2018, it was offering *FiOS* to about [REDACTED] homes passed out of 118 of its total 270 wire centers.¹⁰⁵ However, as of the end of 2018, Frontier states that it was providing *FiOS* service to a total of [REDACTED] residential and business customers in only 76 of its wire centers.¹⁰⁶ By the end of 2019, Frontier had only about [REDACTED] residential and business *FiOS* customers, a loss of more than [REDACTED] over the previous year.¹⁰⁷ Frontier's VoIP services were being targeted primarily at residential subscribers; as of the end of December 2019, only about [REDACTED] business customers were taking VoIP services from Frontier.¹⁰⁸



As of the end of December 2019, Frontier was serving only [REDACTED] residential VoIP subscribers, just under 50% of the VoIP lines in service as of the takeover date. In comparison, Frontier had experienced a far greater drop-off in legacy circuit-switched access lines over that same period.

Notably, Frontier experienced a far greater drop-off in legacy circuit-switched access lines over that same period; On April 1, 2016, the company had 1,201,218 POTS access lines in service; by the end of 2019, that number dropped by a slightly larger percentage -- 52.3% -- to 572,975 access lines, suggesting that the availability of FTTP-based *FiOS* has done little to help Frontier maintain its customer base overall.¹⁰⁹ Table 14.11 below compares Frontier's POTS and

104. Frontier response to CD DR 13-F-3, "Att. 13-F-3 VoIP Line Count (CONFIDENTIAL).xlsx"

105. Frontier response to CD Data Request 15-F-06. Frontier's response to 15-F-06(b) lists a total of 84 wire centers. However, 8 of these have either no *FiOS* customers at all, or only a low single-digit number of them.

106. *Id.*

107. *Id.*

108. Frontier California Response to CD Data Request 11-F-23, FCC Form 477 submissions June 30, 2016 through December 31, 2019,

109. Notably, in its Response to CD DR 11-F-3, Frontier identified 239 out of its total of 278 wire centers (as distinct from "reporting units") as being "Broadband Enabled." See "Attachment 11-F-3 - Confidential Central Office Data.xlsx". In its response to CD DR 11-F-4, Frontier has provided a total of 139,335 VoIP trouble ticket

VoIP markets over the 2016-2019 period based upon the company’s FCC Form 477 submissions, which are provided at 6-month intervals:



Frontier suffered large losses both of POTS and VoIP access lines since assuming control of the company on April 1, 2016 with POTS losses slightly higher, suggesting that the availability of FTTP-based *FiOS* has done little to help Frontier maintain its customer base overall.

Table 14.11

**FRONTIER CALIFORNIA
POTS AND VoIP LINES IN SERVICE
2016-2019**

	VoIP			POTS			Total		
	Total	Consumer	Business	Total	Consumer	Business	Total	Consumer	Business
2016-06-30	██████	██████	██████	1,361,599	632,803	728,796	██████	██████	██████
2016-12-31	██████	██████	██████	1,089,685	513,784	575,901	██████	██████	██████
2017-06-30	██████	██████	██████	987,812	446,350	541,462	██████	██████	██████
2017-12-31	██████	██████	██████	905,236	397,378	507,858	██████	██████	██████
2018-06-30	██████	██████	██████	835,732	355,404	480,328	██████	██████	██████
2018-12-31	██████	██████	██████	733,922	324,528	409,394	██████	██████	██████
2019-06-30	██████	██████	██████	681,546	293,126	388,420	██████	██████	██████
2019-12-31	██████	██████	██████	635,325	265,520	369,805	██████	██████	██████

Source: Frontier California Response to CD Data Request 11-F-23, FCC Form 477 submissions.

Frontier has not provided a technology breakdown with respect to its VoIP services. In response to CD DR 11-F-3, Frontier identified a total of 278 central offices as being “broadband enabled,” and there were 274 different Frontier California wire centers identified in the 139,335 VoIP-related trouble reports that the company processed between July 2016 and December 2019. All else equal, one would expect that both the total number of trouble tickets and the number of out-of-service trouble tickets would experience a corresponding reduction over that same period. We don’t have trouble ticket reports for the April-June 2016 period and the trouble report data for July 2016 appears to be incomplete. Between April 1 and July 31, 2016 alone, Frontier VoIP subscribership dropped by 11.63%, from ██████████. Because we do not have complete trouble report counts prior to August 2016, this analysis will start with the average

records originated between April 1, 2016 and December 31, 2019. See “Attachment 11-F-25 - Revised VoIP Ticket Datas.xlsx” and “Att. 13-F-4 2019 VoIP Trouble Tickets (CONFIDENTIAL).xlsx”. 255 different wire centers are included in this dataset. We have determined, however, that the 75 wire centers with the largest numbers of trouble tickets account for more than 99% of all VoIP trouble tickets over the April 2016 through December 2019 period. For trouble tickets identifying a wire center for which no VoIP service count is available, we have ignored it.

number of VoIP lines in service for August 2016 and continue for the months thereafter.¹¹⁰ Table 14.12 below summarizes the results of this analysis:

By the end of 2019, Frontier California's average monthly VoIP lines in service had decreased by [REDACTED]. Total trouble reports experienced a much greater decrease, to 40.69% of the August 2016 number, indicating improvement overall. However, as far as out-of-service trouble conditions, those actually *increased* by 54.79% despite a 41.74% *decrease* in the number of VoIP lines in service.

110. In order to compare trouble report counts, which arise throughout the month, to VoIP subscriptions in effect during that month, it is necessary to use the *average* number of VoIP subscriptions rather than the end-of-month figures. We calculate the average subscriptions by taking the average of the VoIP lines in service for the last day of the prior month and the last day of the current month.

End of Month	End-of-Month VoIP Lines in Service	Average VoIP Lines in Service for Month	Pct of August 2016	Total VoIP Trouble Reports for Month	Pct of August 2016	Out-of Service VoIP Trouble Reports for Month	Pct of August 2016
2016-03							
2016-04							
2016-05							
2016-06							
2016-07							
2016-08				1,132		162	
2016-09			100.00%	6,200	100.00%	825	100.00%
2016-10			97.10%	6,084	98.13%	753	91.27%
2016-11			94.27%	5,261	84.85%	676	81.94%
2016-12			91.49%	6,281	101.31%	628	76.12%
2017-01			88.86%	7,190	115.97%	769	93.21%
2017-02			86.63%	5,786	93.32%	666	80.73%
2017-03			84.40%	5,430	87.58%	592	71.76%
2017-04			82.57%	3,611	58.24%	636	77.09%
2017-05			80.97%	3,748	60.45%	1,114	135.03%
2017-06			79.52%	3,668	59.16%	998	120.97%
2017-07			78.48%	3,547	57.21%	1,075	130.30%
2017-08			77.74%	4,000	64.52%	1,094	132.61%
2017-09			77.27%	3,089	49.82%	1,023	124.00%
2017-10			76.90%	4,224	68.13%	1,072	129.94%
2017-11			76.41%	3,047	49.15%	1,036	125.58%
2017-12			75.95%	3,676	59.29%	1,100	133.33%
2018-01			75.40%	3,936	63.48%	1,106	134.06%
2018-02			74.74%	2,636	42.52%	746	90.42%
2018-03			74.32%	2,853	46.02%	963	116.73%
2018-04			73.91%	3,038	49.00%	981	118.91%
2018-05			73.37%	2,373	38.27%	987	119.64%
2018-06			72.95%	2,382	38.42%	1,229	148.97%
2018-07			72.49%	3,739	60.31%	1,969	238.67%
2018-08			72.05%	2,552	41.16%	1,292	156.61%
2018-09			71.78%	3,379	54.50%	2,171	263.15%
2018-10			71.46%	2,585	41.69%	1,287	156.00%
2018-11			70.92%	2,373	38.27%	1,256	152.24%
2018-12			70.16%	2,377	38.34%	1,152	139.64%
2019-01			69.27%	3,171	51.15%	1,433	173.70%
2019-02			68.22%	2,921	47.11%	1,332	161.45%
2019-03			67.05%	2,778	44.81%	1,351	163.76%
2019-04			65.86%	2,060	33.23%	975	118.18%
2019-05			64.75%	2,112	34.06%	1,001	121.33%
2019-06			63.89%	1,898	30.61%	961	116.48%
2019-07			63.14%	2,416	38.97%	1,350	163.64%
2019-08			62.42%	2,377	38.34%	1,303	157.94%
2019-09			61.70%	2,070	33.39%	1,090	132.12%
2019-10			60.91%	2,394	38.61%	1,294	156.85%
2019-11			60.06%	2,404	38.77%	1,370	166.06%
2019-12			59.26%	2,523	40.69%	1,277	154.79%

Over the 42-month period from July 2016 through December 2019, Frontier created a total of 139,324 VoIP service trouble tickets, of which less than one-third, 44,095, were associated with out-of-service conditions.¹¹¹ Each of Frontier’s trouble ticket records contain an indication as to the “cause” of the service outage. Combining the identified “cause” with the type of plant involved, there are roughly 300 such identifiers. Table 14.13 below details the number of out-of-service trouble reports associated with each of the top twenty Frontier “cause” descriptions, separately for those instances that did not involve a service outage and for those that did. These are presented in order of the highest to lowest instances of each such Cause.

Table 14.13

FRONTIER CALIFORNIA
VoIP SERVICE OUTAGE CAUSE INDICATIONS

Cause	No service outage	Service outage	Total	Percent of total
██████████	23,035	9,932	32,967	23.66%
██████████████████	10,093	6,344	16,437	11.80%
██████████	6,418	2,704	9,122	6.55%
██████████	5,179	3,077	8,256	5.93%
██████████████	6,263	1,905	8,168	5.86%
██████████	3,883	1,452	5,335	3.83%
██████████	3,479	1,636	5,115	3.67%
██████████	4,342	752	5,094	3.66%
██████████	3,269	982	4,251	3.05%
██████████████████	2,372	715	3,087	2.22%
██████████	1,858	1,041	2,899	2.08%
██████████	2,129	658	2,787	2.00%
██████████	2,036	644	2,680	1.92%
██████████	1,385	927	2,312	1.66%
██████████████	1,216	1,059	2,275	1.63%
██████████████	1,104	938	2,042	1.47%
██████████████	938	927	1,865	1.34%
██████████	1,373	489	1,862	1.34%
██████████████	1,177	583	1,760	1.26%
██████████████	1,214	414	1,628	1.17%
TOTAL				

We have attempted to classify each of the nearly 300 cause/plant type designations into one of thirteen (13) categories so as to facilitate identification of the principal types of VoIP service

111. Frontier Response to CD Data Request 11-F-25. Frontier did not provide any VoIP-related trouble ricket records for Sptil, May or June 2016. Its data did include eleven (11) trouble ticket records pre-dating its takeover of the California ILEC dating back to October 2011. We have ignored these records for purposes of our analysis.

outages that are being experienced by customers. Table 14.14 below summarizes the out-of-service trouble ticket counts for each of these categories:

Cause	No service outage	Service outage	Total	Percent of total
Determined to not be out-of-service or cleared	32,853	13,790	46,643	33.48%
Frontier-provided customer premises equipment	27,171	16,007	43,178	30.99%
Frontier VoIP or FiOS server/network	11,654	4,884	16,538	11.87%
Subscriber distribution outside plant	7,783	3,248	11,031	7.92%
Administrative	6,817	1,777	8,594	6.17%
Customer-provided equipment & Inside Wire Maintenance	4,744	2,118	6,862	4.93%
Frontier employee error	938	927	1,865	1.34%
Customer education	1,231	424	1,655	1.19%
Interexchange or connecting carrier issue	1,009	618	1,627	1.17%
Cause Not Specified	733	174	907	0.65%
Other	210	105	315	0.23%
Employee caused	86	23	109	0.08%
Total	95,229	44,095	139,324	100.00%

While our classifications may not be precise due to limitations in the descriptions provided by Frontier, it is apparent that the principal causes of VoIP-related trouble reports and, in particular, VoIP service outages involve Frontier equipment located on the customer's premises (30.99%), VoIP server or network issues (11.87%), outside plant (7.92%) and a variety of administrative issues (6.17%), some of which may be customer-driven (e.g., non-payment).



Out of the 44,095 VoIP out-of-service reports provided for the period from April 2016 through December 2019, only 25,089, or about 56.9%, appear to be the result of Frontier plant or equipment issues or employee actions.

As noted, not all out-of-service trouble conditions arise due to Frontier California plant failures. Out of the 44,095 VoIP out-of-service reports provided for the period from April 2016 through December 2019, only 25,089, or about 56.9%, appear to be the result of Frontier plant or equipment issues or employee actions.¹¹² Table 14.15 below compares the number of service outage reports associated with such Frontier California plant failures over the same August 2016 through December 2019 period with corresponding numbers of VoIP lines in service:

112. The following trouble report categories fall into this group: Frontier-provided customer premises equipment; Frontier VoIP or FiOS server/network; Subscriber distribution outside plant; Frontier Employee Error; and Employee Caused.

Table 14.15							
FRONTIER CALIFORNIA							
OUT-OF-SERVICE CONDITIONS DUE TO PLANT AND EQUIPMENT FAILURES							
2016-2019							
Service Outage Cause Category							
End of Month	Frontier Equipment	VoIP/FIOS Network / Server	Subscriber Distribution Outside Plant	Frontier employee error	Frontier employee caused	Total	Average VoIP Lines in Service
2016-03							
2016-04							
2016-05							
2016-06							
2016-07							
2016-08	54	23	7	2		86	
2016-09	142	94	31	6		273	
2016-10	233	104	40	8		385	
2016-11	190	105	30	2		327	
2016-12	201	91	48	7		347	
2017-01	210	95	76	10		391	
2017-02	203	75	56	13		347	
2017-03	176	78	34	10		298	
2017-04	231	84	39	6		360	
2017-05	521	155	85	20		781	
2017-06	437	139	70	27		673	
2017-07	476	154	91	17		738	
2017-08	449	129	89	19		686	
2017-09	441	109	85	25		660	
2017-10	433	128	77	19		657	
2017-11	423	186	60	29		698	
2017-12	457	115	83	30		685	
2018-01	542	103	91	44		780	
2018-02	333	75	79	33		520	
2018-03	382	124	108	33		647	
2018-04	392	149	84	43		668	
2018-05	405	125	69	27		626	
2018-06	463	137	94	21		715	
2018-07	662	274	114	30	1	1081	
2018-08	503	134	113	38	2	790	
2018-09	336	103	66	24	13	542	
2018-10	471	149	129	20	2	771	
2018-11	375	111	78	34	1	599	
2018-12	477	87	97	25		686	
2019-01	493	127	158	31	1	810	
2019-02	481	118	150	19	1	769	
2019-03	544	103	108	23		778	
2019-04	390	99	69	42	1	601	
2019-05	371	119	87	24		601	
2019-06	367	77	77	19		540	
2019-07	358	91	79	20		548	
2019-08	540	123	65	32		760	
2019-09	404	147	72	22	1	646	
2019-10	490	156	63	28		737	
2019-11	506	166	80	28		780	
2019-12	445	123	117	17		702	
Totals	16,007	4,884	3,248	927	23	25,089	

When breaking this analysis down to such a granular level, it is difficult to define a “base period” as we had done for Table 14.12 because there is considerable month-to-month variation. That said, it is clear that while the number of VoIP lines has fallen precipitously over the period, the month-to-month frequency of service outages caused by each of these categories of failures seems to have actually increased.

Conclusion

The massive and rapid migration of most California residential customers away from legacy circuit-switched (POTS) services over the past decade is clearly attributable to the increasing availability of competitive as well as technological alternatives to these primarily ILEC-provided services. Many customers have “cut the cord” and have replaced wireline services with wireless; for those who wanted to retain wireline services, VoIP is the principal alternative. Both AT&T California and Frontier California offer individual line VoIP services targeted at the residential and small business market, but demand for ILEC-provided VoIP has been on the decline for several years. Cable TV providers, mainly Comcast and Charter in California, provide VoIP-based telephone service to their residential customers as part of bundled packages that also include broadband Internet access and video content, but typically do not offer voice telephone service on a stand-alone basis. Although there does not appear to be any compelling reason for the Commission to regulate VoIP rates for the majority of customers, there are nevertheless several regulatory challenges that should not be lightly dismissed.

VoIP service is dependent upon locally-provided power, battery backup, and complex customer premises equipment that is not generally required for legacy circuit-switched services. The seemingly higher incidence of VoIP service outages *vis-à-vis* POTS could well be the result of customer premises conditions that are unique to VoIP. These conditions arise both for ILEC- and cable-provided VoIP services. For customers who have “cut the cord” and rely upon some type of over-the-top landline service and/or wireless, access to reliable location reporting for 911 emergency purposes is still far from achieving the accuracy available with fixed wireline services. Finally, the so-called “digital divide” -- an issue whose importance has increased as a result of the COVID-19 crisis -- raises the potential for the loss of high quality wireline voice services in rural and low-income populations. Although the Commission has created Lifeline programs that involve some (but not all) wireless providers, for wireline services the focus has traditionally been on ILEC circuit-switched offerings. As these services are phased out, new Lifeline initiatives that include all major VoIP providers (ILECs and cable MSOs) will need to be formulated. With the sunset of §710 that went into effect as of the beginning of 2020, a comprehensive regulatory approach that embraces all providers of VoIP type services should clearly be a top priority.