



3055 Comcast Place  
Livermore, CA 94551

November 18, 2019

Marybel Batjer, President  
California Public Utilities Commission  
505 Van Ness Avenue  
San Francisco, CA 94102

**Re: Comcast's Response to November 13, 2019 Letter to Steve White**

Dear President Batjer:

PG&E's recent Public Safety Power Shutoff ("PSPS") events have been unprecedented in scope and duration. Precipitated by extreme fire weather conditions, the PSPS events lasted for days and affected large swaths of California and millions of residents. Because the safety of our customers, communities, and employees are our utmost priorities, we have undertaken extra precautions during these extreme PSPS events to ensure public safety. We have worked to protect and restore our network and coordinated closely with the California Public Utilities Commission (the "Commission"), the California Office of Emergency Services ("CalOES"), the California Department of Forestry & Fire Protection ("CAL FIRE"), county emergency officials, and other governmental organizations dedicated to protecting Californians. While prioritizing safety, we have also focused on meeting or exceeding our customers' needs and expectations by providing reliable access to our products and services.

Importantly, we have deployed multiple backup power sources in our wireline network<sup>1</sup> to ensure that the portions of that network that support vital infrastructure can continue to operate during emergencies, including our facilities that serve the cell towers of facilities-based wireless providers.<sup>2</sup> Among other public safety priorities, we have focused on ensuring that our wireless backhaul facilities remain powered because wireless networks are particularly important during

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<sup>1</sup> Comcast is not a facilities-based provider of wireless services in California. Comcast's wireless affiliate, Xfinity Mobile, is a mobile virtual network operator ("MVNO"), with service provided over the Verizon Wireless network.

<sup>2</sup> Your November 13 letter references "previous assurances your companies provided to the [FCC]," in connection with PSPS events. The FCC's Public Safety and Homeland Security Bureau requested information on September 12, 2019, from five facilities-based wireless carriers regarding their "preparation for public safety power shutoffs and wildfires." See PSHSB Chief Writes Wireless Providers Regarding Wildfires, <https://www.fcc.gov/document/pshsb-chief-writes-wireless-providers-regarding-wildfires>. Since, as noted above, Comcast is not a facilities-based wireless carrier, it was not subject to that inquiry and has not participated in the FCC's PS Docket No. 19-251, titled "Promoting Network Reliability During Disasters."

emergency events. Indeed, 80 percent or more of 911 calls originate from wireless devices,<sup>3</sup> and customers evacuating wildfire areas must rely on mobile wireless devices, as do first responders and other emergency service workers. Comcast’s fixed backup generators are situated in locations that allow them to operate safely, without causing a fire hazard, during PSPS events. In addition, we have provided CAL FIRE the location of vital network infrastructure, including headends, hubs, and fiber-optic facilities that support critical facilities such as hospitals and cell sites. We also cooperate with CAL FIRE to help them defend these vital facilities against wildfire damage.

In addition to safeguarding the resiliency of our network, we have been working hard to make sure that our customers can stay connected. We provided Internet service to 11 evacuation centers in Sonoma and Napa counties serving residents that evacuated due to the Kincade Fire. In addition, we routinely open Xfinity Wi-Fi hotspots to help residents and emergency personnel stay connected during times of crisis. We make the hotspots available to everyone for free, including non-Xfinity customers, and thus support the public’s ability to use mobile devices during emergencies—even when other networks are unavailable. In addition, we established approximately two dozen service accounts to support CAL FIRE and the National Guard in the CAL FIRE Incident Command Post at the Sonoma County Fairgrounds in response to the Kincade Fire. Comcast has a long track record of assisting customers and state and local officials when emergencies strike, including during the 2018 Camp Fire, the 2017 Northern California wildfires, the 2017 Oroville Dam evacuation, and the 2014 Napa Earthquake.

That said, as we have made clear to this Commission, the California Legislature, the Federal Communications Commission (“FCC”), and our customers, Comcast’s network, like any modern network, fundamentally relies on commercial power to operate. Although we have deployed battery backup at thousands of key points in our network in California, the batteries are only capable of sustaining operations for a matter of hours – not days. For longer electrical outages, Comcast relies on generators for backup power, but only where we can be sure that it is safe to do so, prioritizing those network locations that support critical communications infrastructure (*e.g.*, wireless backhaul), first responders, and vital community resources. As discussed in detail in Attachment A, our ability to deploy portable generators in situations where fire risk is high (and power is shut off prophylactically) or, in the case of an actual fire emergency, is constrained by public safety considerations – particularly, the risk that generators themselves may pose a serious fire risk and can ignite a wildfire.

In sum, Comcast is committed to protecting the safety of its customers, employees, and all communities affected by devastating wildfires as well as the extensive, multi-day public safety power shutoffs. We are also committed to ensuring that our customers have reliable access to our services. The company recognizes the central role of government in protecting the public and will continue to work closely with the Commission, CalOES, CAL FIRE, and other government organizations to protect all Californians.

Our responses to the specific questions presented in your letter are provided in Attachment A. I look forward to discussing these issues at the upcoming Prehearing Conference.

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<sup>3</sup> See <https://www.nena.org/page/911Statistics>.

Respectfully submitted,



John Gauder  
Regional Senior Vice President, California Region  
Comcast

Cc: Honorable Governor Gavin Newsom, Governor of the State of California  
Liane Randolph, Commissioner, California Public Utilities Commission  
Martha Guzman Aceves, Commissioner, California Public Utilities Commission  
Cliff Rechtschaffen, Commissioner, California Public Utilities Commission  
Genevieve Shiroma, Commissioner, California Public Utilities Commission  
Mark Ghilarducci, Director, California Governor's Office of Emergency Services  
Thomas Porter, Director, California Dept. of Forestry and Fire Protection (CAL FIRE)  
Amy Tong, Director, California Department of Technology  
Service List of R.18-03-011

ATTACHMENT A

Comcast's Responses to Specific Questions

## Attachment A - Comcast's Responses to Specific Questions

### 1. Responsiveness during the latest wildfires and public safety power shutoffs to keep communications services on.

Wireless companies appear to have not been adequately prepared for the outages from the number of cell sites that were out of service. Cable companies appear to have had massive network outages due to lack of power. Landline facilities failed. In order to mitigate the risk of these types of issues occurring in the future, specifically identify:

**The amount and type of power available on site at your central offices, headends and wireless switches, indicating how long these facilities can operate at average load without main power and what your plan is to refuel, if a generator is present. Separately, indicate the number of remotes, field cabinets, nodes or other devices between the subscriber's homes and your central office and headends, and how long each of these devices can operate at average load without main power. Further, provide your refueling plans for these field cabinets, nodes, and remotes.**

#### **COMCAST'S RESPONSE:**

By way of background, the major components of Comcast's hybrid fiber-coaxial network are headends, hubs, and power supplies, which in turn feed nodes, amplifiers, and line extenders. A headend is a centralized facility for receiving and processing television signals for distribution over a cable TV system. A headend also includes equipment needed to enable broadband and voice over Internet Protocol ("VoIP") services. A headend typically serves a broad geographic area (e.g., a medium-sized city or a section of a large city). Hubs distribute optical signals throughout the service area. Nodes convert the optical signals to electric (radio frequency) signals for distribution over coaxial cable, while line extenders and amplifiers boost the signal as needed to reach each subscriber's home. All of these devices operate using commercial power. A simplified diagram of a typical hybrid fiber-coaxial network is attached as Exhibit 1.

*Headends and Hub Sites:* Comcast has backup power systems at its 129 headends and hubs in California. In 2018 and 2019, Comcast made significant investments to upgrade the power network and backup power capabilities at these facilities. All Comcast headends and hub sites have either a direct current ("DC") battery backup system or a fixed alternating current ("AC") generator (typically diesel fueled) and, in most cases, have both systems. Comcast also has trailer-based portable AC generators that can be rapidly deployed to headends and hub sites that have no fixed generator.<sup>1</sup> The DC battery backup systems typically operate for approximately four to 12 hours. The AC generators can continue to provide power as long as they can be safely

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<sup>1</sup> Because Comcast needs time to determine when and where to deploy generators of this type, it is essential that PG&E provide Comcast with adequate advance notice of PSPS events, as required by the Commission's decision in the De-Energization Rulemaking.

refueled. Comcast monitors the fuel consumption of these generators and schedules refueling once the fuel level reaches 50 percent.

*Other Network Components:* Between Comcast’s headends and subscribers’ homes, there are approximately 15,000 other network components that rely on commercial power (i.e. power supplies which in turn feed commercial power to nodes, amplifiers, and line extenders). Each device is equipped with battery backup that can operate for approximately 4 to 24 hours without commercial power. Thereafter, Comcast would need to deploy a portable generator to each active network device that has lost commercial power. Depending on the size of the PSPS event, this would require the deployment of thousands of portable generators to keep the Comcast network fully operational. As discussed below, such an undertaking would not be safe or feasible.

Comcast has considered other power backup solutions, such as swapping out depleted batteries. However, this approach is not feasible because it would require Comcast to maintain thousands of batteries in storage – which is in tension with environmental regulations that limit the number of batteries that can be stored.<sup>2</sup> Moreover, switching out batteries can cause sparks, which also poses fire risks.

*Challenges Associated with PG&E’s Extended PSPS Events:* PG&E’s PSPS events during October 2019 created unique challenges for the deployment of generators. Because the PSPS events were initiated during times of “extreme fire weather conditions,” safety considerations restricted Comcast’s ability to widely deploy its fleet of 400 portable generators. Comcast understands from wildfire experts that there is significant fire ignition risk associated with deploying and refueling portable generators when fire risk is extreme – as it is during a PSPS event or a fire event.<sup>3</sup> In fact, the U.S. Forest Service recognizes this danger by

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<sup>2</sup> The FCC has considered the feasibility and safety of backup power in wireless networks in multiple proceedings over more than a decade, and the records of those proceedings include substantial evidence of the practical challenges and potentially serious environmental and safety risks of widespread deployment of backup generators and batteries. *See, e.g.*, Comments of CTIA – The Wireless Association, PS Docket No. 11-60, at 12 (Aug. 17, 2012) (noting that “the power systems used by back-up batteries and generators contain lead, sulfuric acid, oils, and flammable liquids that may subject back-up power facilities to a host of federal, state, and local environmental and safety laws that strictly limit their placement and use”); Comments of PCIA – The Wireless Infrastructure Association, PS Docket No. 11-60, at 5-6 (July 7, 2011) (noting that “[i]n addition to environmental and noise considerations, the National Fire Protection Association (NFPA) has issued model fire safety regulations for battery storage that could also adversely affect the use of backup power,” which have been adopted in all 50 states). This Commission has acknowledged the same concerns in its own proceedings and comments to the FCC. *See* Comments of the California Public Utilities Commission and the People of the State of California, PS Docket Nos. 13-75 and 11-60, at 13 (May 14, 2013) (discussing a 2008 CPUC report on backup power, in which service providers “indicated that increased numbers of batteries and larger fuel storage can trigger requirements to comply with state and federal EPA rules, local fire codes, state air quality regulations, hazardous materials loading rules, and building safety rules”).

<sup>3</sup> Comcast understands that, for safe operation, portable generators must never be operated within confined spaces and must be placed level on bare ground or hard pavement that contains no combustible vegetation, at a safe distance from any nearby structures. Generators must also be equipped with a

prohibiting operation of internal combustion engine-driven equipment, including portable generators, during “red flag” fire conditions unless the equipment is in an area completely devoid of vegetation.<sup>4</sup> Unfortunately, there have been multiple incidents of portable generators causing fires during recent PSPS events.<sup>5</sup> As a result, there are only limited locations to which Comcast can safely deploy portable generators during a PSPS event, such as where there are no trees or other vegetation in close proximity to the generator or where Comcast can lay a gravel base for the generator, which generally is not possible when Comcast’s equipment is located on private property or is not readily accessible.

Additionally, the PSPS events of October 2019 were unprecedented in scope and duration. PG&E’s PSPS event of October 9 - 12 spanned 35 counties and nearly 4 days, while its larger PSPS event of October 23 – November 1 covered 38 counties and lasted more than a week. These events impacted more than one quarter of Comcast’s service territory and approximately 4,000 powered network components. Aside from the inherent fire risk associated with deploying thousands of gasoline-powered portable generators, practically speaking, it would be infeasible to safely and securely deploy and refuel so many generators throughout the impacted area. Finally, PG&E failed to give Comcast the required amount of advance notice or the level of specificity required by the Commission’s order in the De-Energization rulemaking, which hindered Comcast’s ability to minimize the adverse impact on the company’s network.

Despite these challenges, Comcast took meaningful steps during the PG&E PSPS events<sup>6</sup> to ensure that the portions of its network that support vital infrastructure did not lose power – prioritizing network components that support and serve broader geographic areas (*e.g.*, headends and hubs), other communications infrastructure (*e.g.*, cell site backhaul), and first responder and other vital community resources (*e.g.*, hospitals and evacuation centers). For example, Comcast

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functional spark arrester, placed in areas where they can safely be accessed and refueled, and anchored for security against theft during extended power outages.

<sup>4</sup> See 36 C.F.R. §§ 261.52(h), (j) (restricting operation of internal combustion engines in areas with fire restrictions); *see also* San Bernardino National Forest, Current Fire Restrictions, available at [https://www.fs.usda.gov/detail/sbnf/home/?cid=fsbdev7\\_007776](https://www.fs.usda.gov/detail/sbnf/home/?cid=fsbdev7_007776) (explaining that, under current fire restrictions, “[a] generator with an approved spark arrester may be operated for recreational purposes on areas that are barren or cleared of all flammable materials for at least a five-foot radius around the generator, or if they are internally contained within a recreational vehicle”) (emphasis added); Fires... What to Know Before You Visit the National Forest, available at the following [URL](#) (describing U.S. Forest Service fire restrictions for the operation of internal combustion engine-driven equipment including generators during “red flag” fire conditions unless the equipment has an approved spark arresting device and is in an area completely devoid of vegetation).

<sup>5</sup> See, *e.g.*, Bill Gabbert, *Generators Causing Fires During Planned Power Shutoffs*, WILDFIRE TODAY (Sept. 29, 2019), <https://wildfiretoday.com/2019/09/29/generators-causing-fires-during-planned-power-shutoffs/> (reporting on three fires caused by generators in Nevada County, California during recent PSPS events). See also U.S. Consumer Product Safety Commission, *Fire-Related Incidents Associated with Engine-Driven Generators in 2004 through 2014* at 38-42 (2015) (reporting on at least 186 reported non-work-related fire incidents associated with generators from 2004 to 2014, with many involving refueling portable generators).

<sup>6</sup> Comcast’s facilities were not impacted by the Kincade Fire in Sonoma County.

has fixed backup generators in place to support its backhaul facilities that serve cell towers. These fixed backup generators are situated in locations that allow them to operate safely during PSPS events for as long as they can be refueled. Comcast has tools that determine fuel consumption based on current load and generator and schedules refueling when the fuel level reaches 50%. Comcast also identified certain limited locations where portable generators could be safely deployed to support first responders and vital community assets and which could be safely sited in the manner described above.<sup>7</sup> However, given the extreme fire danger, as just explained, Comcast could not safely deploy all of its 400 generators in California to other locations.

**For wireless providers, provide a list of the cell sites which you have located in the Tier 2 and Tier 3 fire threat areas and how long each facility can operate at average load with onsite power. If the site has a generator, how long can this site operate at average load without refueling and what are your refueling plans?**

**COMCAST’S RESPONSE:**

Not applicable. As noted, Comcast does not own or operate a commercial mobile wireless network and, as such, is not a facilities-based provider of wireless services in California. Instead, Comcast’s wireless affiliate, Xfinity Mobile, is a mobile virtual network operator (“MVNO”), with service provided over the Verizon Wireless network.

**Describe the locations in your network where actions need to be taken to harden the communications infrastructure for risk, including but not limited to, wildfires and PSPS events. Provide a list of specific locations that allow emergency responders to understand where catastrophic events (wind, water, fire, earthquake and subsidence) may have local and regional reliability impacts. This must include areas and communities where fiber backhaul routes do not have adequate hardening or physical redundancy.**

**COMCAST’S RESPONSE:**

*Network Hardening:* To further enhance the reliability and resiliency of its network, Comcast conducts patrol inspections of its overhead and underground facilities as part of its daily operations throughout its service areas to ensure that its facilities are in good working order and in compliance with General Order (“G.O.”) 95 and G.O. 128. Both the frequency and thoroughness of Comcast’s inspections have produced positive results in terms of ensuring reliable service and safety to persons engaged in the construction, maintenance, operation, or use of overhead lines and to the public in general. Comcast also notifies pole owner(s) and owners of attached facilities of any non-conformances associated with other parties’ facilities identified during inspections. These efforts help to ensure that Comcast’s network can operate reliably during high wind events.

In recent years, Comcast has accelerated its construction of redundant and diverse routing for its backbone network facilities to enhance the reliability and resiliency of its network. For example,

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<sup>7</sup> See supra note 3.



Comcast completed multiple projects involving the construction of new fiber-optic facilities to create diverse routing within its network and built new fiber-optic facilities to deliver upgraded, more reliable service to rural communities. In addition, as noted above, in 2018 and 2019 Comcast made significant investments to upgrade the power network and backup power capabilities at headends and hub sites and implemented a program that permits remote monitoring of fuel levels at fixed generators. Projects such as these are ongoing.

As discussed above, Comcast's network relies on commercial power to operate in the normal course of business, and Comcast has approximately 15,000 active network components in California that operate using commercial power. Although Comcast has battery backup power for those active components, the safety considerations created by the widespread deployment of portable generators render it essentially impossible for Comcast to remain fully operational during multi-day power outages affecting large swaths of its service territory.

*Locations with Reliability Impacts:* The components of Comcast's network that may have local and regional reliability impacts are its headends, hubs, and nodes. During prior emergencies, Comcast has provided CAL FIRE with information about the location of its vital infrastructure that were at risk, including headends, nodes, and fiber-optic facilities that support critical facilities such as hospitals and cell sites. Comcast has worked cooperatively with CAL FIRE to enhance its ability to defend these vital facilities against wildfire damage.

The specific locations of Comcast facilities are highly sensitive critical infrastructure data that could cause security issues if made publicly available.<sup>8</sup> For example, this information in the hands of a bad actor could be used to readily disable large portions of Comcast's network. Comcast is prepared to assemble a list of specific locations of its infrastructure that may have regional or local impacts (*e.g.*, headends, nodes, backbone transport facilities, and wireless backhaul facilities) that can be provided confidentially to first responders on a county-by-county basis, so long as such authorities have procedural and substantive protections on par with federal confidentiality statutes and rules.

**Provide the reports of outages which you sent to the FCC for each day of the recent Disaster Information Reporting System (DIRS) activation in California.**

**COMCAST'S RESPONSE:**

Attached as Confidential Exhibit 2 are reports submitted to the FCC for each day of the recent Disaster Information Reporting System (DIRS) activation in California. The Commission has found similar outage reports to be confidential.<sup>9</sup> In an accompanying letter, Comcast

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<sup>8</sup> See 47 C.F.R. § 0.457(d)(vi), (viii) (designating as "records not routinely available for public inspection" comparable information filed with the FCC, including outage reports and site-specific explanations provided with 911 reliability certifications).

<sup>9</sup> G.O. 133-D, section 4.d ("Major Service Interruption reports submitted to the Commission pursuant to these rules shall be treated as confidential in accordance with Pub. Util. Code § 583 and General Order 66-C").

respectfully requests confidential treatment of Confidential Exhibit 2 pursuant to Pub. Util. Code § 583 and General Order 66-D.

## **2. Engagement and timely responsiveness to requests from Cal OES and CAL FIRE.**

**Cal OES Director Ghilarducci has recently identified concerns related to information sharing and coordination with local governments, especially county emergency management departments during emergency events. The November 1, 2018 workshop identified problems that emergency agencies have with getting timely and correct information from the communications providers. They include, but are not limited to, general communication processes and procedures, accuracy and timeliness of providing relevant information, and establishing two-way communication channels that enable the utilities to address local concerns. Though a representative of the communications companies through the California Utilities Emergency Association (CUEA), has a desk in the state warning center, the Director was clear that there was a lack of participation and transparency during the recent events. Therefore, communication providers are directed to take immediate corrective actions that, at a minimum, include:**

**Confirm the name of an Emergency Operations Center (EOC) liaison that can be present 24/7 in the state operations center during emergency response events. The EOC liaisons shall be trained in emergency response, in accordance with Standardized Emergency Management System (SEMS) and have working knowledge of utility operations and business processes.**

### **COMCAST'S RESPONSE:**

During prior emergencies, such as the 2018 Camp Fire and the recent PSPS events, Comcast made Darrell Johnson, Compliance Manager, or Thomas Smith, Sr. Manager Business Continuity, available as EOC liaisons. Messrs. Johnson and Smith are well versed in Comcast's network and business operations, both in "business as usual" and emergency conditions. During the recent PSPS events, these liaisons were available to CalOES's State Operations Center ("SOC") in Sacramento on a 24x7 basis; Mr. Johnson or Mr. Smith were on site at the SOC for the majority of the day and available overnight via cell phone.

Going forward, Comcast confirms that it will make available Mr. Johnson; Mr. Smith; Joseph Leto; Director – Network Operations; Kevin Domer, Compliance Manager; or another qualified representative available on a 24x7 basis if requested. Comcast will also ensure that each liaison receives SEMS training.

**Develop and implement processes that will ensure that County EOC liaisons will have the latest information during PSPS and wildfire events and are enabled and empowered to resolve local issues as they arise.**

## **COMCAST'S RESPONSE:**

During prior emergencies, Comcast's Government Affairs Directors have acted as the primary liaisons to county Emergency Operations Center personnel and other county officials. These directors receive regular updates from Comcast network personnel on the status of PSPS and wildfire events and their impact on Comcast's network. Comcast's Government Affairs Directors provide support to local officials as requested. For example, Comcast's Government Affairs Director for Sonoma and Napa counties facilitated Comcast's provision of Internet service to 11 evacuation centers serving residents who evacuated due to the Kincade Fire. In addition, they helped establish approximately two dozen service accounts to support CAL FIRE and the National Guard in the CAL FIRE Incident Command Post at the Sonoma County Fairgrounds in response to the Kincade Fire. Comcast will continue to refine and enhance its county-level support for future emergencies.

**Establish a more effective communication structure with state, county and tribal government emergency management personnel. This communications structure shall be separate and unique from general updates to local governments and other stakeholders to allow for emergency personnel to receive the support and information required to properly respond.**

As noted above, Comcast's Government Affairs Directors have acted as the primary liaisons to county officials during prior emergencies. In Comcast's experience, city and local officials often have unique needs and preferences for communicating and responding to emergencies, and Comcast's team has worked closely with each jurisdiction to develop working relationships and establish effective processes. Comcast welcomes feedback from local officials as to how to improve its support of their operations. In addition, Comcast voluntarily provided CalOES with twice daily updates about its VoIP and Internet outages during PG&E's late-October PSPS event on a county-by-county basis, and since the 2014 Napa Earthquake, Comcast has also been providing informal outage updates to Commission staff during large scale events. Finally, Comcast has become a member of the California Utilities Emergency Association in order to facilitate its submission of outage data to CalOES and to improve coordination between industry and government during times of emergency.

### **3. Compliance with D.19-08-025.**

**Decision 19-08-025 directs communications carriers to provide a minimum level of consumer protections and safety actions in the case of a declared disaster. Based on responses we have received so far, the CPUC needs to hear more specifics about what you are doing, and provide specifics such as what equipment and when.**

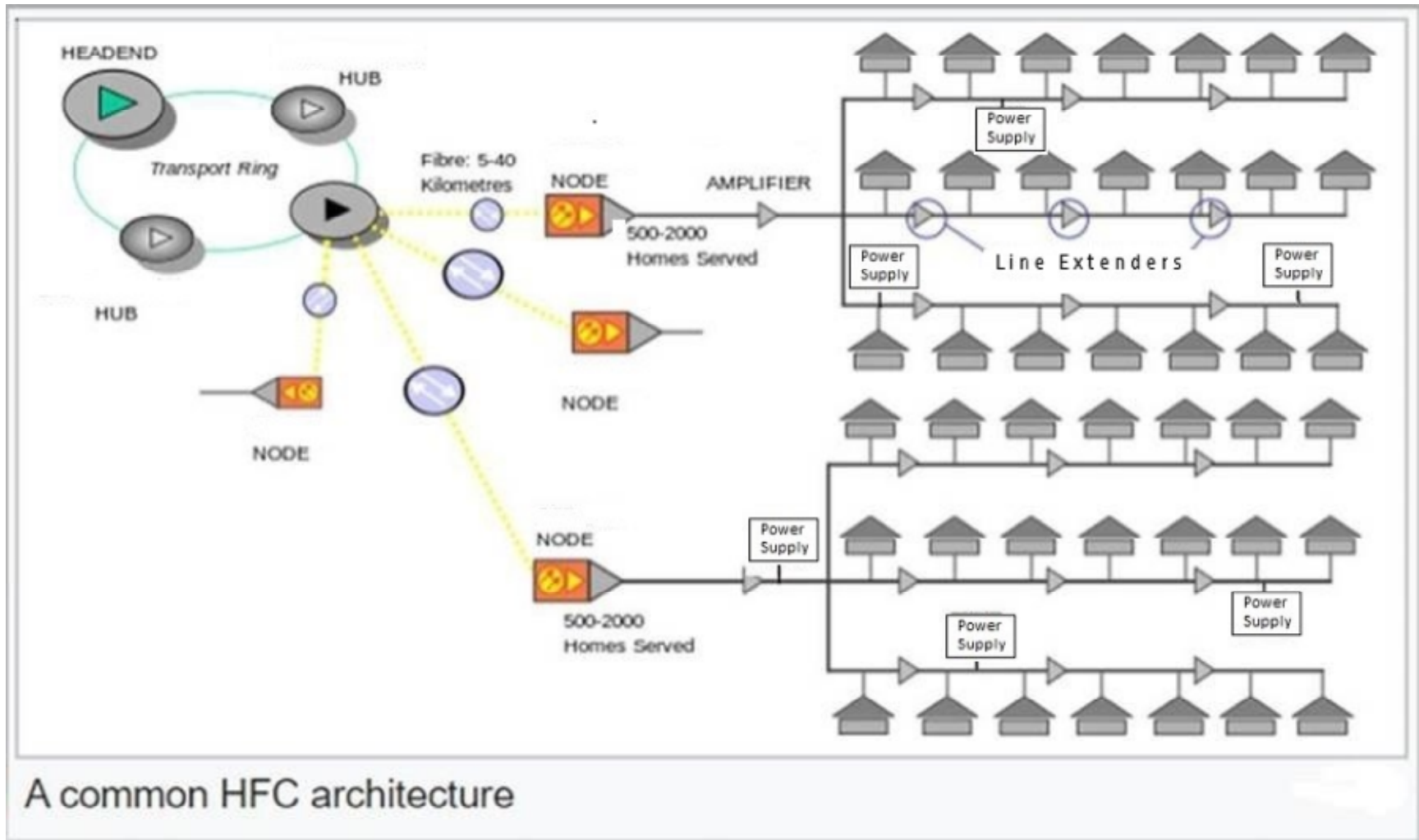
Comcast confirms that it is in compliance with the requirements of Decision 19-08-025. On October 12, 2019, Comcast filed an Advice Letter with the Communications Division describing the company's plan to make customers aware of the consumer protection measures for disaster victims established in the Rulemaking 18-03-011.

On November 12, 2019, Comcast filed an Advice Letter with the Communications Division describing Comcast's implementation of the consumer protection measures triggered by Governor Newsom's October 27, 2019 statewide Emergency Proclamation precipitated by the "extreme fire weather conditions" and widespread PSPS events. In that Advice Letter, the company described how, in lieu of remote call forwarding (a feature associated with traditional telephone service), Comcast customers were able to access their VoIP service remotely using the Comcast app on a mobile device, tablet, laptop, or desktop computer – at no extra cost. Comcast also explained that several of the consumer relief measures (namely, those related to inside wiring and installation fees) were not applicable to the declared emergency because no Comcast customers' homes or businesses were damaged or destroyed by the PSPS events. Finally, Comcast confirmed that it made mobile phones available to evacuation centers.

In addition, as required by Decision 19-08-025, Comcast used a variety of outreach methods to communicate with its customers as appropriate during each of the recent PSPS events, including updates on the Comcast California webpage, social media (Twitter and Facebook), and media alerts. Comcast customers could receive information about the status of their account using the Comcast "My Account" mobile app and a feature on the Comcast/Xfinity webpage. These platforms allow Comcast to communicate quickly with its customers. In addition, Comcast's customer service representatives were available to provide information relating to the PSPS events. Comcast also deployed employees to evacuation centers where they assisted Comcast customers with accessing their VoIP service remotely (as described above).

EXHIBIT 1  
Network Diagram

EXHIBIT 1



(PUBLIC VERSION)

EXHIBIT 2

Request for Confidential Treatment and Confidential DIRS  
Reports are not included