Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Resilient Networks	)	PS Docket No. 21-346
	)	
Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications	)	PS Docket No. 15-80
	)	
New Part 4 of the Commission's Rules Concerning Disruptions to Communications	)	ET Docket No. 04-35

COMMENTS OF THE WIRELESS INFRASTRUCTURE ASSOCIATION

The Wireless Infrastructure Association ("WIA")[1] respectfully submits these Comments in response to the Commission's *Notice of Proposed Rulemaking* (*NPRM*)[2] seeking comment on efforts to improve the voluntary Wireless Network Resiliency Cooperative Framework. WIA applauds the Commission for addressing the questions of building resilient and redundant broadband networks. WIA appreciates the opportunity to provide input regarding how the wireless infrastructure industry supports connectivity and works to improve network resiliency during disasters and emergencies.

I. HOW MOBILE WIRELESS NETWORKS REPSONDED TO THE COVID-19 PANDEMIC.

WIA wholeheartedly agrees that "[r]esilient communications networks are critical to economic growth, national security, emergency response, and nearly every facet of modern life."[3]

[1] The Wireless Infrastructure Association (WIA) represents the businesses that build, develop, own, and operate the nation's wireless infrastructure. Members include infrastructure providers, wireless carriers, and professional services firms that are responsible for telecommunications facilities around the globe.

[2] *See In the Matter of Resilient Networks*, Notice of Proposed Rulemaking, FED. COMMC'NS COMM'N, PS Docket No. 21-346 (rel. Oct. 1, 2021) ("*NPRM*").

[3] *Id*. at ¶ 4.

If anything, the COVID-19 pandemic has created an even deeper recognition of how essential reliable broadband connectivity is to every household and to every business. Dramatic consumer usage changes, including work-from-home, remote learning, and telehealth, generated an unprecedented demand for wireless connectivity anchored by the need for wireless infrastructure. As the enormity of the COVID-19 pandemic became clear in early 2020, most jurisdictions enacted stay-at-home orders, schools closed, and businesses moved to remote work. This drove mobile traffic up twenty percent, essentially overnight, yet mobile data speeds kept pace. However, this was not the case in other countries. According to an Ookla report, China's mobile download speeds saw speed decreases of up to forty percent during their peak COVID-19 restrictions, while Italy saw decreases of up to twenty-three percent, and Spain saw decreases up to fifteen percent.[4] Over two-thirds of European countries experienced mobile speed decreases of up to thirty percent in late March, according to OpenSignal.[5] This is an example of how the wireless industry's network investments have enabled the entire economy to sustain itself during the pandemic. The efforts of WIA member companies helped businesses to stay afloat, children to continue learning, and first responders and health care providers to offer critical care.

The pandemic has shown in stark terms the importance of communications networks during unforeseen disasters. In the early months of the pandemic, the Broadband Deployment Advisory Committee's ("BDAC") Disaster Response and Recovery Working Group ("DRRWG") delivered a unanimous, consensus report that outlined the challenges and solutions to ensure that reliable, resilient broadband was available before, during, and after natural disasters.[6] WIA's

[4] *Tracking COVID-19's Impact on Global Internet Performance*, OOKLA, https://www.speedtest.net/insights/blog/tracking-covid-19-impact-global-internet-performance/#/United%20States (last updated July 20, 2020).

[5] *Id*.

[6] *Report and Recommendations: COVID-19 Response*, FED. COMMC'NS COMM'N BROADBAND DEP. ADVIS. COMM. DISASTER RESPONSE & RECOVERY WORKING GRP., (Oct. 29, 2020),

President & CEO, Jonathan Adelstein, served as the vice-chair with Red Grasso, First Responder Emerging Technologies Program Director for North Carolina's Department of Information Technology, serving as its chair. The First DRRWG Report highlighted ways in which the wireless infrastructure industry has worked to prepare for disasters and to promote resilient networks. For example, industry stakeholders engage in pre-storm staging processes to protect cell sites and other facilities from potentially catastrophic events. This includes clearing combustible materials from sites in fire-prone areas and integrating third-party deployables with wireless provider and fiber backhaul networks.[7]

Right after the first report, the DRRWG was tasked with preparing a second report examining how broadband networks were impacted by the pandemic. The Second DRRWG Report found that wireless networks performed remarkably well during the pandemic. They aided those working and learning from home, how permitting challenges arising out of the pandemic may have affected broadband deployment, how providers sustained their networks in the face of increasing and shifting data demands, and ways that technology could be leveraged to mitigate similar challenges in the future. This success was made possible in part because of "the continuous investments made by providers to stay ahead of projected demands."[8]

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https://www.fcc.gov/sites/default/files/bdac-disaster-response-recovery-approved-rec-10292020.pdf [hereinafter *BDAC DRRWG Report*].

[7] *See id*. at 5 ("[I]n advance of a disaster event, industry stakeholders prepare towers and other facilities for potentially catastrophic events by taking steps including but not limited to: Securing all attachments to towers and poles; Topping off generator fuel tanks and fuel stores; Validating battery reserves; Preparing for refueling shuttles of each respective fuel type; Validating and coordinating 24/7 site access or scheduling; Preparing sandbagging material and operations for expected water level rise; Clearing combustible materials from sites in fire-prone areas; Confirming pumps are functioning in advance of flooding; Securing sites under construction; Moving mission-critical equipment to high ground, avoiding flooding risks, ensuring reliable power, and fuel storage for response; Installing ground stations for fixed wireless backhaul; and Integrating third-party deployables with wireless provider and fiber backhaul networks.").

[8] *Report and Recommendations: COVID-19 Response*, Disaster Response and Recovery Working Group, FED. COMMC'NS COMM'N (Oct. 29, 2020) ("Second DRRWG Report") at 2, https://www.fcc.gov/sites/default/files/bdac-disaster-response-recovery-approved-rec-10292020.pdf.

The Second Report also recommended that industry and government stakeholders promote wireless infrastructure resiliency by:

> utiliz[ing] governmental processes to facilitate preparatory activities in advance of emergency or disaster events, including expedited permitting processes for the transport of fuel, generator operations, communications and construction supplies, and temporary housing and workforces. Such processes should also include procedures for obtaining event-specific, time-limited waivers and physical access to infrastructure.[9]

The Commission should consider these recommendations, as it pursues this proceeding, but it should also refrain from any strict regulatory mandates that could stifle efforts already underway.

II. INDUSTRY EFFORTS TO MAINTAIN CONNECTIVITY DURING DISASTERS.

The COVID-19 pandemic has shown how wireless broadband serves as a key lifeline during storms, natural disasters, and other emergencies. Providing that lifeline is the industry's goal every day. Wireless providers and network builders have invested significant resources to strengthen and harden networks and to improve network resiliency and planning.[10] In 2017, Hurricane Harvey's unprecedented floodwaters affected only five percent of the thousands of wireless facilities in the affected areas of Texas and Louisiana.[11] In the wake of Hurricane Katrina, 1.75 million telecommunications lines were downed while only 1,000 cellular transmission towers were affected.[12] Six months after the storm, 130,000 lines remained out while cellular service was fully operational.[13] After the catastrophic events of 9/11, many point-to-point wireless links were

[9] *Id.* at 6 (citing First DRRWG Report at 2).

[10] *See 2019 Annual Survey Highlights*, CTIA at 5 (June 20, 2019), https://api.ctia.org/wp-content/uploads/2019/06-/2019-Annual-Survey-Highlights-FINAL.pdf (stating that the wireless industry invested over $253 billion between 2010 and 2019).

[11] Nick Ludlum, *The Wireless Industry Responds to a Historic Hurricane Season*, CTIA (Sept. 26, 2017), https://www.ctia.org/news/the-wireless-industry-responds-to-a-historic-hurricane-season.

[12] Paula Rhea, *Hurricane Katrina: Telecom Infrastructure Impacts, Solutions, and Opportunities*, VERIZONBUSINESS (Feb. 12-16, 2006), https://archive.nanog.org/meetings/nanog36/presentations/rhea.pdf.

[13] *Id.*

established to supplement the loss of a main switching station housed in the World Trade Center. These links were installed in a matter of days, and many remain as a source of permanent backup.[14]

Once disasters occur, the availability of multiple providers and networks can help consumers and businesses stay connected to critical services and information. Fiber is a state-of-the art network architecture that provides outstanding bandwidth and broadband service and is an essential element of any national broadband buildout effort but comes with its own tradeoffs. WIA members own and operate most of the fiber in the U.S. Regarding its resiliency, like other wireline infrastructure, we are aware that fiber can be vulnerable to damage from natural forces.[15] In rural areas, fiber is usually deployed on utility poles, which is often the most cost-effective means of deployment. However, deployment on utility poles can leave networks vulnerable to interruptions from wind, ice loading, trees falling, snow and storms, fire, and hurricanes.[16]

Fiber buried underground is a preferred method because it can be more resilient than when strung on utility poles. However, it is not a perfect solution because it is still vulnerable to fiber cuts and other disruption often caused by excavation. Furthermore, it can be far more costly to deploy, time consuming to deploy and repair, and sometimes impractical depending on the soil and topography. Indeed, as climate change continues to increase the severity of weather events, fiber and other wireline infrastructure will face increased exposure to risk. It is estimated that over 1,000 miles of long-haul fiber conduit and almost 2,500 miles of metro fiber conduit will be

[14] Zayan EL Khaled & Hamid Mcheick, *Case Studies of Communications Systems During Harsh Environments: A Review of Approaches, Weaknesses, and Limitations to Improve Quality of Service*, 15 INT'L J. DISTRIB. SENS. NETS. (Feb. 24, 2019), https://doi.org/10.1177%2F1550147719829960.

[15] *See, e.g.*, *The Real Cost of Fiber Cuts: How to solve using Gigabit Wireless*, GIGABIT WIRELESS (Mar. 15, 2016) (noting, among common reasons for outage such as tornadoes and hurricanes, squirrels accounted for 28% of damages to fiber lines in 2010).

[16] *See* THE COMPLETE GUIDE TO FIBER TO THE PREMISES DEPLOYMENT, PPC at 8 (2020), https://www.ppc-online.com/fiber-to-the-premises-ebook.

underwater by 2032.[17] Unfortunately, these trends are not improving. Extreme heat waves and large storms are predicted to become more common.[18] Wireline infrastructure will continue to face vulnerabilities that are different than wireless options.[19]

Wireless networks help to ensure that multiple providers and networks are available when disaster strikes. Through overlapping site coverage, diverse deployment of fiber backhaul, and extensive investments in deployable assets, wireless providers can mitigate the impact of disasters on their networks and often restore service more quickly than wireline fiber. However, as Commissioner Starks noted from his visit to Puerto after Hurricanes Irma and Maria, "communications services are only as good as their access to power."[20]

III. ELECTRIC POWER OUTAGES ARE THE MAJOR CULPRIT OF NETWORK OUTAGES.

WIA appreciates that the Commission is "explor[ing] communications resilience strategies to address one of the primary reasons for service disruptions: Electric power outages."[21] Commissioner Starks also described the prevalence of the problem in Puerto Rico,[22] and WIA members report that electric power outages are the major reason why customers lose service due to disasters. Loss of electrical power can create outages of telecommunications service for wired and wireless networks. Providers of both fiber and wireless broadband are equally and deeply

[17] Ramakrishnan Durairajan et al., *Lights Out: Climate Change Risk to Internet Infrastructure*, In Proceedings of the Applied Networking Research Workshop 2018 (July 16, 2018).

[18] *See Climate Change Indicators: Weather and Climate*, ENVIRON. PROT. AGEN., https://www.epa.gov/climate-indicators/weather-climate (last visited June 16, 2021).

[19] Anthony Townsend & Mitchell Moss, *Telecommunication Infrastructure in Disasters: Preparing for Crisis Communications*, N.Y.U. CTR. FOR CATASTROPHE PREP. AND RESP. at 8 (April 2005) ("Wireless links, whose links are constructed out of intangible electromagnetic radiation, reduce some of the vulnerability of wired networks"); *see also* David Theodore, *A Climate-Proof Internet is Here and Critical Infrastructure Needs it Yesterday*, CLIMATE RESILIENT INTERNET (Feb. 6, 2020) (suggesting a wireless alternative using point-to-point millimeter wave links as a fail safe for when fiber lines are downed).

[20] *NPRM* at p. 46.

[21] *NPRM* at ¶ 3.

[22] *Id.* at p. 46 ("During the 2020 earthquakes in Puerto Rico, the overwhelming majority of cell-site outages resulted from power loss, not damage to facilities.")

committed to serving their customers' needs in emergencies; however, each is subject – in differing degrees – to the lack of a reliable electric grid. Fiber-to-the-premise (FTTP) networks face the more intractable problem of loss of power to the premise in addition to the network. Most in-home fiber includes a battery backup that lasts twenty-four hours.[23] After those twenty-four hours, services including telephone and 9-1-1 services are lost. Power is often lost in rural areas for weeks even in regularly occurring ice storms and even longer in the wake of disasters. Restoring electrical service to all the homes in the wide areas often affected by these larger natural disasters is a lengthy process.

Wireless connectivity requires the difficult, but far less onerous, challenge of providing power only to the transmission site, such as a tower, to serve all the households in the service area regardless of if they have power on their premises. However, challenges remain. The day after Hurricane Ida made landfall in New Orleans, AT&T noted that its wireless network in Louisiana was "operating at 60% of normal and [had] significant outages in New Orleans and Baton Rouge due to power outages, flooding and storm damage. [AT&T] had key network facilities go offline overnight, and while some have already been restored, some facilities remain down and are inaccessible due to flooding and storm damage."[24] Indeed, the following day, Verizon noted that "[d]espite the widespread flooding, commercial power outages and structural devastation caused by Hurricane Ida, currently 85% of Verizon cell sites that were in the path of the storm [were] in service. About half of [its] out-of-service sites have overlapping coverage from nearby sites, meaning most customers [were] able to get a signal."[25] As their experience shows, flooding and

[23] *See* Public Notice, *Public Safety and Homeland Security Bureau Reminds Providers of Facilities-Based Residential Voice Services That are Not Line-Powered of Upcoming Requirement to Offer Subscribers 24 Hours of Backup Power for Customer Premises Equipment*, FED. COMMC'NS COMM'N DA 18-1205 (rel. Nov. 27, 2018), https://docs.fcc.gov/public/attachments/DA-18-1205A1.pdf.

[24] AT&T, *Supporting Communities Impacted by Hurricane Ida* (last updated Oct. 21, 2021, 11:00am CDT), https://about.att.com/pages/disaster_relief/storm_ida.html.

[25] https://www.verizon.com/about/news/verizon-response-hurricane-ida (August 31 afternoon update).

power outages are the major sources for disruption during hurricanes. However, restoring one tower can quickly provide service to an entire area, versus having to repair numerous fiber breaks or entire areas of poles washed, burned, or blown away.

The Commission is right to look into the difficulties in maintaining power at cell sites during disasters, like hurricanes; however, imposing backup power generator mandates at every cell site would be ill advised and impracticable. WIA members make every effort to reduce the frequency, duration, or severity of power-related disruptions at their cell sites. Indeed, WIA member companies often provide several solutions to maintain network operations during outages, storms, and other disasters, including backup generators, network monitoring, and emergency repairs.[26] However, providing backup power via generators poses its own problems. As Verizon explained:

> Throughout the day, our engineers and technicians have been using multiple means of transportation - including air boats - to complete site survey work in inaccessible areas and restore service to impacted cell sites. They will continue to deploy mobile assets as needed, work with our fiber vendors to repair broken fiber, and continue massive refueling operations to keep generators running until commercial power is restored.[27]

The only major, commercially available backup generators are diesel-powered. Keeping these generators running presents logistical challenges amid flooding, wildfires, and other natural disasters. WIA cautions the Commission against a proscriptive mandate, such as minimum backup power at ever site, in favor of allowing industry to use every tool to mitigate outage impact. Infrastructure and service provides work to carefully leverage all assets, including refueling operations, network traffic management, and supplemental antennas, such as Cells on Wheels (COW) and Cells on Light Trucks (COLT) to restore network operations as quickly as possible

[26] *See, e.g.*, *Backup Power*, AMERICAN TOWER, https://www.americantower.com/us/solutions/backup-power.html (last visited Apr. 19, 2021).

[27] https://www.verizon.com/about/news/verizon-response-hurricane-ida (August 31 afternoon update).

after disaster. Though diesel-powered generators are important sources of backup power, they are one tool the industry uses, and present unique drawbacks that must be considered when ensuring network resiliency. Despite these challenges, WIA members have generally been able to keep generators running providing tower sites remain accessible. These successes indicate a strict minimum runtime or deployment of generators at ever cell site is not necessary.

IV. INFORMATION SHARING BETWEEN NETWORK OPERATORS, THE COMMISSION, AND OTHER AGENICES IS VITAL DURING DISASTERS.

WIA applauds the Commission's efforts to promote information sharing with other government agencies. It is very important that government agencies work together at the federal, state, and local levels, sharing information when disasters occur. As Chairwoman Rosenworcel noted when the Commission published its first comprehensive review of Hurricane Ida's impact on networks, after activating DIRS for parts of Alabama, Louisiana and Mississippi: "We're sharing this data with FEMA, DHS and local officials to help safely restore service as quickly as possible in as many places as possible."[28] It is important that the Commission continue these efforts so first responders at the local level can have the appropriate information and act as quickly as possible to save lives.

Similarly, the wireless industry has also committed to fostering mutual aid during and in the aftermath of a disaster through the Wireless Resiliency Cooperative Framework.[29] For example, WIA members work with these agencies to promote solutions for their connectivity as they respond to disasters, providing generators and other equipment and services to affected facilities like hospitals, Emergency Communications Centers ("ECC"), and first responders in

[28] https://twitter.com/JRosenworcel/status/1432448006691885059.

[29] *See Wireless Resiliency Cooperative Framework*, FED. COMMC'NS COMM'N, https://www.fcc.gov/wireless-resiliency-cooperative-framework (updated Aug. 30, 2021) at 2.

advance of a disaster event.[30] The First DRRWG Report recommends that wireless stakeholders continue to deploy resilient broadband infrastructure through the development of new and enhanced standards for construction as technologies continue to evolve, as well as government review of infrastructure permitting and pole attachment regulations to facilitate the deployment of resilient broadband infrastructure.[31]

Furthermore, the Commission should consider additional means of fostering improved coordination between communications service providers and power companies. As stated previously, power outages are a major source of network disruption, so cooperation by electric utilities is essential to ensuring that networks remain online to enable the vital communications of those affected by disasters and the life-saving operations of first responders.

V. PUBLIC SAFETY AND FIRST RESPONDERS RELY ON MOBILE WIRELESS NETWORKS.

Wireless assets, such as cell on wheels ("COWs"), can be quickly rolled in to provide temporary network capacity—including backhaul when a fiber connection is lost— and restore connectivity. This speed of response is simply not always possible in primarily wireline networks that may reach many affected premises. Wireless networks also can be rerouted and optimized during and after a disaster. If one cell site is offline, the network can use capacity from another site to maintain connectivity.[32] Furthermore, wireless networks also have unparalleled self-healing capabilities that are being enhanced with 5G technology. Fiber networks in rural areas, particularly aerial fiber that is damaged by storms, tend to take longer to restore.

[30] *See* First DRRWG Report at 8 (noting that an ECC is a facility with capabilities that include intelligence collection and monitoring, 9-1-1 multimedia traffic processing, full scale dispatch, and incident command capabilities).

[31] *See id*. at 9.

[32] *How Wireless Kept Americans Connected During COVID-19*, CTIA at 3 (June 23, 2020), https://api.ctia.org/wp-content/uploads/2020/06/How-Wireless-Kept-Americans-Connected-During-COVID-19-2.pdf.

VI. CONCLUSION.

The DRRWG Reports and the COVID-19 pandemic have highlighted the importance of resilient networks to promoting public safety during disasters and emergencies. The Commission has also recognized the importance of industry and government coordination in the construction of new infrastructure and review of existing infrastructure permitting and pole attachment regulations to the promotion of resilient broadband infrastructure. In terms of other actions that the Commission can pursue, it is also important that the Commission continue to provide flexibility by granting waivers of certain rules, as needed, when disasters occur. For example, at the onset of the COVID-19 pandemic, the Commission issued Special Temporary Access licenses for network operators to utilize different spectrum bands. However, the Commission should refrain from mandating backup power generators at every cell site, for they present dangers in flood and fire prone areas, as well as potential conflict with local laws. WIA appreciates this opportunity to inform the Commission of the wireless infrastructure industry's efforts to support resilient networks and public safety communications. WIA and its members look forward to continued collaboration with the Commission and interested stakeholders.

Respectfully submitted,

/s/ Stephen Keegan

Stephen Keegan
Associate Counsel, Government Affairs

WIA – The Wireless Infrastructure Association
2111 Wilson Blvd., Suite 210
Arlington, VA 22201
(703) 739-0300

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