

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Reliability and Continuity of Communications)	PS Docket No. 11-60
Networks, Including Broadband Technologies)	
)	

COMMENTS OF CTIA

Thomas C. Power
Senior Vice President and General Counsel

Scott K. Bergmann
Senior Vice President, Regulatory Affairs

Matthew B. Gerst
Assistant Vice President, Regulatory Affairs

Jennifer L. Oberhausen
Director, Regulatory Affairs

CTIA
1400 Sixteenth Street, NW
Suite 600
Washington, DC 20036
(202) 785-0081

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CTIA¹ submits these comments in response to the *Public Notice* issued by the Public Safety and Homeland Security Bureau (“Bureau”) regarding the effectiveness of the Wireless Network Resiliency Cooperative Framework (“Wireless Cooperative Framework” or “Framework”).²

I. INTRODUCTION AND SUMMARY.

Recognizing the increasingly important role of mobile wireless services during emergencies, CTIA’s member companies are committed now more than ever to deploying robust and resilient wireless services and networks that millions of consumers rely upon during storms, natural disasters, and other wide-spread emergencies, as well as for everyday life. As a result of applying lessons learned from previous emergency events and implementing the flexible approach outlined in the Wireless Cooperative Framework, availability of wireless services

¹ CTIA® (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st- century connected life. The association’s members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry’s voluntary best practices, hosts educational events that promote the wireless industry, and co-produces the industry’s leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, DC.

² *Public Safety and Homeland Security Bureau Seeks Comment on the Effectiveness of the Wireless Network Resiliency Cooperative Framework and for the Study on Public Access to 911 Services During Emergencies*, Public Notice, DA 18-614 (rel. Jun. 13, 2018) (*Public Notice*).

played a critical role in improving safety and enhancing coordination during the historic 2017 hurricane season.³

Indeed, as hurricanes struck Texas, Louisiana, Florida, Mississippi, Alabama, the U.S. Virgin Islands, and Puerto Rico, millions of consumers were able to rely on mobile wireless services when they needed it the most. As the City of Houston observed in response to a Public Notice issued last year on response efforts undertaken during the 2017 hurricane season,⁴ the Houston Emergency Center received 60,000 9-1-1 calls in one day during Hurricane Harvey – a Category 4 storm – which represents a ten-fold increase over the typical number of daily calls the center receives on average.⁵ In Florida, Miami-Dade County officials urged residents to use mobile apps for shelter, power outage, gas station, and traffic updates during and after Hurricane Irma.⁶ And in Puerto Rico and the U.S. Virgin Islands, where Hurricanes Maria and Irma devastated critical infrastructure, wireless services were available to 74 percent of Puerto Ricans and 93 percent of U.S. Virgin Islanders by early November of 2017, despite the fact that just 43 percent of Puerto Ricans and less than 25 percent of U.S. Virgin Islanders had access to commercial power at that time.⁷ The extensive resiliency and restoration practices of wireless

³ Letter from Joan Marsh, AT&T Services, Inc.; Charles McKee, Sprint; Grant Spellmeyer, U.S. Cellular; Scott Bergmann, CTIA; Steve Sharkey, T-Mobile USA; and William H. Johnson, Verizon, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket Nos. 11-60 & 13-239 (Apr. 27, 2016) (“Wireless Cooperative Framework”), <https://ecfsapi.fcc.gov/file/60001707365.pdf>.

⁴ *Public Safety and Homeland Security Bureau Seeks Comment on Response Efforts Undertaken During 2017 Hurricane Season*, Public Notice, 32 FCC Rcd 10245 (2017) (“2017 Hurricanes Response Efforts PN”).

⁵ City of Houston Comments, PS Docket No. 17-344, at 4 (Jan. 22, 2018). Hereinafter, all cites to comments refer to comments filed in PS Docket No. 17-344 unless otherwise noted.

⁶ CTIA Comments at 2.

⁷ FCC, *Communications Status Report for Areas Impacted by Hurricane Maria*, at 2-3 (Nov. 6, 2017), <https://docs.fcc.gov/public/attachments/DOC-347526A1.pdf>; U.S. Department of Energy, *Hurricanes Maria & Irma, November 6 Event Summary (Report #74)*, at 2-3 (Nov. 6, 2017), https://www.energy.gov/sites/prod/files/2017/11/f46/Hurricanes%20Maria%20and%20Irma%20Event%20Summary%20November%206%2C%202017_0.pdf.

providers, along with the flexible approach of the Wireless Cooperative Framework, proved instrumental in achieving these results during the unprecedented conditions presented by the 2017 storms.

The Framework in particular proved effective in enhancing service continuity and information sharing during and immediately after these historic storms and helped wireless providers restore service as quickly as possible when cell sites went down.⁸ Looking ahead to the 2018 hurricane season and beyond, the wireless industry continues to take additional steps consistent with the Wireless Cooperative Framework to further bolster resiliency and preparedness.

Relevant to this Bureau-level inquiry into methods for measuring the “effectiveness” of the Wireless Cooperative Framework is the recent rejection by the Federal Communications Commission (“Commission”) of an approach to measure resiliency through numerical performance-based metrics.⁹ Less than two years ago, the Commission terminated a wireless resiliency proceeding in which the Commission initially had proposed the use of numerical performance-based metrics.¹⁰ In doing so, the Commission found that the Framework’s voluntary approach presented “a more appropriate path forward for improving wireless resiliency and provider transparency.”¹¹ As explained in these comments, CTIA believes the Commission’s reasoning for rejecting such metrics is equally applicable here with respect to the

⁸ See CTIA Comments; CTIA Reply Comments.

⁹ *Improving the Resiliency of Mobile Wireless Communications Networks*, Order, 31 FCC Rcd 13745 (2016).

¹⁰ *Id.* at ¶ 23.

¹¹ *Id.* at ¶ 1 (“In light of the substantial concerns identified in the record with respect to proposed metrics and possible consequences of the disclosure proposal initially advanced in our *Notice*, in this *Order* we find that the ‘Wireless Network Resiliency Cooperative Framework’ (Framework) as submitted by AT&T, CTIA – The Wireless Association (CTIA), Sprint, T-Mobile, U.S. Cellular, and Verizon presents a more appropriate path forward to improving wireless resiliency and provider transparency, and we refrain from adopting further regulations at this time.”) (citations omitted).

use of standardized numerical metrics to measure the effectiveness of the Wireless Cooperative Framework. Specifically, CTIA explains:

- The Framework – which works in conjunction with other resiliency efforts by wireless providers – cannot be assessed without considering the context of the providers’ efforts to maintain and restore wireless services;
- Standardized numerical metrics fail to recognize that each emergency event is a unique event and that each event can impact communities in vastly different ways;
- The use of standardized numerical metrics likely would result in inaccurate representations of the Framework’s effectiveness because it would fail to recognize other variables that affect resiliency; and
- The use of standardized numerical metrics could provide misguided incentives that could hinder resiliency efforts and chill participation in the Framework.

Given these issues, CTIA encourages the Commission to continue to take a flexible, outcome-based approach to assessing the effectiveness of the Wireless Cooperative Framework. A flexible, outcome-based approach would enable providers to continue extensive efforts to respond to unique emergency events, while providing the Commission with an appropriate basis to evaluate the effectiveness of the Framework.

CTIA also urges the Bureau to continue to promote awareness of the Wireless Cooperative Framework among industry, public safety, and state and local government partners so that all stakeholders will be better positioned to maximize the benefits offered by the Framework’s flexible approach. Further, as CTIA addressed previously, stakeholders across the communications ecosystem, including energy, broadcast, cable, and backhaul providers, could be encouraged to voluntarily implement those elements of the Framework that are relevant to their facilities and not already addressed in the formal and informal arrangements that wireless providers have with those stakeholders.

II. THE WIRELESS COOPERATIVE FRAMEWORK PROVED AN EFFECTIVE TOOL FOR ADVANCING WIRELESS SERVICE CONTINUITY AND RESTORATION DURING THE HISTORIC 2017 HURRICANE SEASON.

A. The Framework Was Developed Through Collaborative Efforts Recognizing the Need for a Flexible Approach to Wireless Network Resiliency and Restoration.

Following Superstorm Sandy, policymakers from the Commission and Congress, CTIA, and its members convened to identify solutions for improving the resiliency of the nation's wireless communications networks. These efforts resulted in the 2016 Wireless Cooperative Framework.

The Framework commits wireless provider signatories to actionable steps that keep consumers connected when emergencies occur by encouraging collaborative wireless network continuity and restoration efforts. To that end, the Framework focuses on five key elements during qualifying emergency events:

- Encouraging reasonable roaming among wireless providers under disaster arrangements when technically feasible;
- Fostering mutual aid, such as the sharing of physical assets, among wireless providers;
- Enhancing municipal preparedness and restoration through best practices and encouraging communications between wireless providers and Public Safety Answering Points;
- Increasing consumer readiness and preparation through the development and dissemination with consumer groups of a "Consumer Readiness Checklist;" and
- Improving public awareness and stakeholder communications on service availability and restoration status through Commission publishing of data on cell site outages on an aggregated, county-by-county basis in the relevant area through its Disaster Information Response System ("DIRS").

The common-sense, actionable items identified in the Framework help to harness the collective resources of the wireless industry, the Commission, and municipalities and public safety entities. Working in conjunction with the application of lessons learned from past storms,

the Framework is designed to keep consumers connected when disasters occur and expedite service restoration when networks go down. The nation's five largest wireless providers, AT&T, Sprint, T-Mobile, U.S. Cellular, and Verizon, all committed to adopt the Framework at the time of its announcement in 2016.¹² Following the Framework's announcement, GCI and Southern Linc filed letters indicating their intent to participate in the Framework, and the Competitive Carriers Association filed its support of the Framework and "commit[ted] to many of the same principles...."¹³

Government and public safety stakeholders alike commended the Framework as an important step to help keep consumers connected and save lives. Ranking Member Pallone hailed the Wireless Cooperative Framework as an agreement that "will save lives during major emergencies like Superstorm Sandy" and commended industry and the Commission for working "to craft a comprehensive agreement that ensures consumers have access to wireless service during an emergency even if their wireless network goes down."¹⁴ Similarly, the Association of Public-Safety Communications Officials-International, Inc. told the Commission that the Framework "can lead to great improvements to wireless network resiliency, restoration, and overall preparedness and response, in disaster situations."¹⁵ As mentioned above, the

¹² See Wireless Cooperative Framework.

¹³ Letter from Kara Azocar, Regulatory Counsel, Federal Affairs, GCI Communication Corp., to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 11-60 (Sept. 1, 2017); Letter from Michael Rosenthal, Director of Legal & External Affairs, Southern Linc, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 11-60 (Sept. 5, 2017); Letter from Rebecca Murphy Thompson, EVP & General Counsel, Competitive Carriers Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket Nos. 11-60 & 13-239, at 1 (May 31, 2016).

¹⁴ Press Release, Congressman Frank Pallone, Jr., *CTIA & Pallone Announce "Wireless Network Resiliency Cooperative Framework" for Disasters and Emergencies* (Apr. 27, 2016), <https://pallone.house.gov/press-release/ctia-pallone-announce-%E2%80%9Cwireless-network-resiliency-cooperative-framework%E2%80%9D-disasters>.

¹⁵ Comments of APCO, PS Docket Nos. 11-60 & 13-239, at 3 (May 31, 2016).

Commission later adopted an order expressing support for the Framework, finding the Framework’s voluntary approach “a more appropriate path forward for improving wireless resiliency and provider transparency” than the use of metrics that the Commission initially had proposed,¹⁶ and terminating its docket in which numerical metrics had been proposed.¹⁷

The wisdom of the Framework’s approach would be brought into clearer focus in 2017 when four historic hurricanes hit communities across Texas, Louisiana, Florida, Mississippi, the U.S. Virgin Islands, and Puerto Rico.

B. Consumers Turned to Wireless Services Throughout the 2017 Hurricane Season.

Wireless networks proved resilient during the historic 2017 hurricane season. This resiliency allowed consumers to turn to wireless services when they needed them the most, especially in Texas, Louisiana, Florida, Alabama, and Mississippi. For example:

- According to the City of Houston during Hurricane Harvey, “[w]ireless networks in the immediate area of Houston stayed up and operational with only limited, localized interruptions.”¹⁸ Moreover, when service interruptions did occur, the City of Houston noted that services were restored by wireless providers in as short as “a few hours” in some cases.¹⁹
- Accounts from wireless providers echo the City of Houston’s statements. Verizon, for example, reports that 98 percent of its network facilities in the hardest hit areas of Texas remained in service during and after Harvey.²⁰

¹⁶ *Improving the Resiliency of Mobile Wireless Communications Networks*, Order, 31 FCC Rcd 13745, ¶ 1 (2016).

¹⁷ *Id.* at ¶ 23.

¹⁸ City of Houston Comments at 6.

¹⁹ *Id.* at 7.

²⁰ Verizon Comments at 1. Moreover, because wireless networks are designed with numerous, overlapping cell sites that provide maximum capacity and continuity of service even when individual sites are inoperable, the number of cell site outages does not necessarily correlate to the availability of wireless service to consumers.

- In Louisiana, only six cell sites went down as a result of Hurricane Harvey,²¹ despite the storm dropping over 17 inches of rain near Lake Charles.²²
- The resiliency of wireless networks in response to Hurricane Harvey allowed consumers to receive important public safety communications. Indeed, the National Weather Service and local alerting authorities sent over 300 Wireless Emergency Alerts warning people around Houston about Hurricane Harvey and its rising floodwaters.
- Wireless networks in Florida displayed similar levels of resiliency in response to Hurricane Irma. Close to 97 percent of Verizon's facilities,²³ and approximately 92 percent of cell sites overall,²⁴ were operational in Florida five days after Hurricane Irma made landfall.
- The resiliency of wireless networks in Florida allowed Miami-Dade County officials to urge residents to use mobile apps for shelter, power outage, gas station, and traffic updates during and after Hurricane Irma.²⁵

Yet, as those who collaborated to develop the Wireless Cooperative Framework recognized, no two events are the same. Hurricane Maria was the most intense hurricane to hit Puerto Rico and the U.S. Virgin Islands in nearly a century. While cell towers largely withstood the effects of these storms,²⁶ devastating winds nonetheless knocked out power to the islands and severely impacted communications and transportation channels. These conditions contributed to the challenge of coordinating with local authorities as wireless providers tried to deploy resources and assist in restoration and recovery efforts.

²¹ FCC, *Communications Status Report for Areas Impacted by Post-Tropical Cyclone Harvey*, at 3 (Sept. 2, 2017), <https://docs.fcc.gov/public/attachments/DOC-346477A1.pdf>.

²² Weather.com, *Historic Hurricane Harvey's Recap* (Sept. 2, 2017), <https://weather.com/storms/hurricane-/news/tropical-storm-harvey-forecast-texas-louisiana-arkansas>.

²³ News Release, Verizon, *Hurricane Irma: Florida update from Southeast Market President Russ Preite* (Sept. 15, 2017), <https://www.verizon.com/about/news/hurricane-irma-florida-update-southeast-market-president-russ-preite>.

²⁴ FCC, *Communications Status Report for Areas Impacted by Hurricane Irma*, at 3 (Sept. 15, 2017), https://apps.fcc.gov/edocs_public/attachmatch/DOC-346754A1.pdf.

²⁵ CTIA Comments at 2.

²⁶ See, e.g., Puerto Rico Telecommunications Regulatory Board Comments at 2-3 (noting that less than two percent of Puerto Rico's cell towers were damaged by the 2017 hurricanes).

The wireless industry worked around the clock to restore and maintain services in the U.S. Virgin Islands and Puerto Rico in the days, weeks, and months following Hurricanes Maria and Irma. As a result of these efforts, wireless networks in Puerto Rico were processing 12 million calls and six million texts each day by mid-October, even as the electrical grids remained devastated.²⁷ As noted previously, 74 percent of Puerto Ricans and 93 percent of the population of the U.S. Virgin Islands were covered by wireless service by early November, despite the fact that less than 43 percent of Puerto Ricans and less than 25 percent of U.S. Virgin Islanders had access to commercial power at that time.²⁸

C. The Framework – Combined with Lessons Learned – Played a Key Role in Enabling Network Resiliency and Restoration Efforts.

As CTIA has explained in response to the *2017 Hurricanes Response Efforts PN*, the resiliency of networks during the 2017 hurricane season was due in part to lessons learned from previous storms and key actions facilitated by the Wireless Cooperative Framework.²⁹ Indeed, following Hurricane Katrina and Superstorm Sandy, wireless providers identified lessons learned from those catastrophic storms and developed practices to prepare for future storms. These actions resulted in billions of dollars of investment by the wireless industry to strengthen and harden wireless networks and improve network resiliency planning and practices by wireless providers.

Further, wireless network operators have designed, deployed, and managed robust, resilient networks using a regional approach to tailor their network deployments and restoration plans as appropriate for that environment. For example, in the southern regions operators design

²⁷ AT&T, Hurricane Maria: Response & Live Updates, *Connectivity Update* (Oct. 20, 2017), http://about.att.com/inside_connections_blog/hurricane_maria.

²⁸ FCC November Status Report at 2-3, *supra* note 7; DOE November Summary at 2-3, *supra* note 7.

²⁹ See CTIA Comments; CTIA Reply Comments.

specifically for hurricanes, flooding, and other related disasters; in California they design specifically for earthquakes. Similarly, restoration plans and assets are positioned based on their specific network deployment as well as associated disaster-relief plans. Operators have been applying lessons learned from previous disasters and working proactively to improve network resiliency over the years.

Earlier this year multiple wireless providers described to the Commission efforts to strengthen the resiliency of their networks. T-Mobile, which has “invest[ed] billions of dollars over the years to fortify [its] networks,” recounted the proactive measures it has taken to minimize outages, including comprehensive planning around network hardening, continuously adding capacity to its network, conducting ongoing assessments throughout the year, pre-staging equipment, and coordinating with other wireless providers and industry partners regarding mutual aid.³⁰ And when the 2017 hurricanes hit, T-Mobile had more than 500 employees involved in the recovery process as it deployed resources, including 2,000 generators, to further service restoration and resiliency.³¹

Verizon noted similar experiences. Verizon attributed its high level of resilience in part to a variety of methods and practices specifically designed to increase resiliency during and after events like the 2017 hurricanes.³² These actions included the siting and placement of wireless equipment to account for the likelihood of hurricanes and natural disasters, and the pre-staging of

³⁰ T-Mobile Comments at 3.

³¹ *Id.* at 7.

³² Verizon Comments at 4.

fuel deliveries and temporary transmitter facilities to respond to hard-hit areas as quickly as possible.³³

The actionable items identified in the Framework complemented these resiliency efforts.³⁴ Roaming arrangements helped wireless providers keep consumers connected and expedite service restoration during unprecedented conditions. As one example, the wireless providers operating in Puerto Rico and the U.S. Virgin Islands opened up roaming to ensure service to the maximum population with the coverage available on the islands.³⁵ Moreover, existing commercial arrangements also were used where appropriate. Wireless providers also shared resources and provided mutual aid. For example, wireless providers shared space on a cargo plane to transport generators to Puerto Rico following Hurricane Maria and coordinated initial restoration efforts to avoid duplication.³⁶ Elsewhere, a carrier allowed another to use its facilities in the U.S. Virgin Islands during Hurricane Irma.³⁷ These arrangements allowed

³³ *Id.* at 4-5.

³⁴ *See, e.g.*, T-Mobile Comments at 13 (“the voluntary Wireless Resiliency Cooperative Framework worked well....”); Verizon Comments at 19 (“The Wireless Resiliency Framework to date has served consumers, state and local governments and services providers well through its flexible and practicable approach....”); Reply Comments of AT&T at 8-9 (describing the effectiveness of the Framework in during and after the 2017 hurricanes); Reply Comments of Virgin Islands Telephone Corp. d/b/a Viya at 14 (“many of the successes of the 2017 hurricane season were a result of the Wireless Resiliency Cooperative Framework”); Verizon Reply Comments at 5 (“service providers’ Framework-related commitments proved effective in giving the public visibility into where the hurricanes had the most significant impact on networks.”).

³⁵ FCC, *Communications Status Report for Areas Impacted by Hurricane Maria*, at 2-3 (Oct. 12, 2017), <https://docs.fcc.gov/public/attachments/DOC-347207A1.pdf>; *see also*, Letter from Steve Sharkey, Vice President, Technology and Engineering Policy et al., T-Mobile, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 17-344, Attachment at 7 (Jan. 8, 2018) (*T-Mobile Ex Parte Letter*) (noting that T-Mobile brokered inter-company roaming).

³⁶ *T-Mobile Ex Parte Letter* Attachment at 7.

³⁷ U.S. Government Accountability Office, GAO-18-198, Report to the Ranking Member, Committee on Energy and Commerce, House of Representatives: *Telecommunications: FCC Should Improve Monitoring of Industry Efforts to Strengthen Wireless Network Resiliency*, at 24 (Dec. 2017), <https://www.gao.gov/assets/690/688927.pdf>.

wireless providers to maximize their collective resources for the benefit of consumers in impacted areas.

The success of the Framework’s approach also can be attributed to its inherent flexibility, as wireless providers were able to tailor their efforts in 2017 to the unique challenges presented by each of the storms and their effect on individual communities. These efforts resulted in a number of collaborative and innovative solutions to restore service to consumers. For example, AT&T and T-Mobile partnered with Alphabet’s Project Loon to provide LTE-based services to tens of thousands of people in Puerto Rico using a network of balloons.³⁸ Similarly innovative, AT&T used a “flying cell on wings,” or a drone cell site, to temporarily provide data, voice, and text services over a forty mile radius in Puerto Rico in the aftermath of Hurricane Maria.³⁹ These responses not only helped consumers maintain and regain connectivity but also allowed wireless providers to target their resources to where they would have the most impact, helping individuals and communities begin the long recovery and rebuilding process.

Moreover, the solutions deployed by wireless providers in 2017 may have spurred the development and deployment of new innovative technologies and solutions that can be used in future disaster and emergency situations to restore and provide connectivity. For example, Verizon recently announced that it also is testing a drone solution that can provide LTE service throughout a one mile range, and that such drones will be available for use this year in the case

³⁸ Monica Allevén, *T-Mobile joins AT&T in collaborating with Project Loon in Puerto Rico*, FierceWireless (Oct. 28, 2017), <https://www.fiercewireless.com/wireless/t-mobile-joins-at-t-collaborating-project-loon-puerto-rico>.

³⁹ Rob LeFebvre, *AT&T’s ‘Flying COW’ drone provides cell service to Puerto Rico*, Engadget (Nov. 6, 2017), <https://www.engadget.com/2017/11/06/att-flying-cow-drone-cell-service-puerto-rico/>.

of a natural disaster.⁴⁰ The Puerto Rico Telecommunications Regulatory Board further noted earlier this year that it is “convinced” that the services used to provide connectivity when traditional commercial cellular networks suffered outages should be utilized in future mitigation plans.⁴¹ Thanks to the flexibility provided under the Wireless Cooperative Framework, the wireless industry continues to develop and utilize these and other new and innovative solutions to restore connectivity in the aftermath of disasters and emergencies.

D. The Wireless Industry Is Already Taking Steps to Further Bolster Resiliency, Service Restoration, and Preparedness Heading into the 2018 Hurricane Season.

As the wireless industry looks ahead to the 2018 hurricane season and beyond, CTIA’s member companies remain committed to continuing to prepare for future emergencies and disasters. Along these lines, CTIA released Best Practices for Enhancing Emergency and Disaster Preparedness and Restoration in late 2017, as committed to in the Framework.⁴² The Best Practices are a set of tools to help coordinate joint efforts by wireless providers and local governments to maintain service continuity, promote resiliency efforts, and expedite restoration activities during and after a disaster. The Best Practices were developed collaboratively by the signatories to the Wireless Cooperative Framework and local government and public safety officials from a diverse set of localities across the country. The participants disseminated the

⁴⁰ CNBC, *Phone service can mean life or death after a disaster and AT&T and Verizon are using drones that could help* (June 24, 2018), <https://www.cnbc.com/2018/06/22/att-and-verizon-drones-provide-cell-service-in-natural-disasters.html>.

⁴¹ Puerto Rico Telecommunications Regulatory Board Comments at 12.

⁴² Press Release, CTIA, *CTIA Announces New Best Practices to Help Local Governments Maintain Wireless Service During Natural Disasters* (Dec. 20, 2017), <https://www.ctia.org/news/ctia-announces-new-best-practices-to-help-local-governments-maintain-wireless-service-during-natural-disasters>.

Best Practices through social media and by working with third party organizations affiliated with local government representatives across the country.⁴³

Also consistent with the Framework, CTIA and its members continue to support efforts to create a database of carrier and PSAP contacts. And, as mentioned previously, wireless providers continue to develop new and innovative methods for expediting the restoration of service for those situations in which network outages occur.⁴⁴ The cumulative effect of these efforts are helping to ensure that wireless networks are more resilient, service can be restored faster, and all stakeholders are more prepared for the 2018 hurricane season.

III. RIGID METRICS TO MEASURE THE EFFECTIVENESS OF THE WIRELESS COOPERATIVE FRAMEWORK WOULD BE COUNTERPRODUCTIVE TO WIRELESS NETWORK RESILIENCY.

A. The Commission Should Take a Flexible, Outcome-Based Approach to Assessing the Effectiveness of the Wireless Cooperative Framework.

As millions of wireless consumers increasingly rely upon mobile wireless services throughout emergencies, the wireless industry continues to take substantial actions to bolster network resiliency and ensure information sharing in preparation for and response to diverse and unique emergency events. For this reason, the Commission should continue to reject the use of rigid metrics to measure the use and effectiveness of the Wireless Cooperative Framework which would more likely undermine, rather than facilitate, efforts to enhance wireless resiliency. The *Public Notice* asks questions about potential numerical metrics, such as the percentage of

⁴³ See, e.g., CTIA, *Wireless Industry Commitment: Best Practices for Enhancing Emergency and Disaster Preparedness and Restoration* (“Best Practices”), <https://www.ctia.org/the-wireless-industry/industry-commitments/wireless-network-resiliency-cooperative-framework> (last visited July 11, 2018); Francisco Sanchez (@DisasterPIO), Twitter (Dec. 21, 2017, 12:02 PM), <https://twitter.com/DisasterPIO/status/943934745418895360> (“We recently worked with @CTIA to develop new list of best practices to help to maintain #wireless service during natural disasters. Click here for full article <http://bit.ly/CTIABestPractices> ...”).

⁴⁴ See *supra* Section III.C. (discussing efforts by providers to develop and deploy innovative technologies and solutions that can be used in future disaster and emergency situations to restore and provide connectivity).

customers covered by roaming agreements or the percentage of calls completed due to roaming agreements during an emergency.⁴⁵ As explained further below, the Commission instead should take a flexible approach to assessing the effectiveness of the Framework based on outcomes, taking into account the context of particular events.

First, the Framework cannot be assessed without considering the context of the providers' efforts to maintain and restore wireless services when measuring the Framework's effect on promoting wireless resiliency and rapid restoration. As explained herein, the Framework plays a complementary role to individual mobile wireless provider investments in hardening of wireless networks and a host of other activities providers take to ensure resiliency. Collectively, the wireless industry has invested billions of dollars to strengthen the resiliency of wireless networks, including the addition of greater capacity and increased densification to wireless networks. And, based on lessons learned from previous storms, providers have engaged in comprehensive planning and developed methods and practices to expedite responses to hard-hit areas, such as pre-positioning critical equipment, topping off fuel cartridges for backup generators, and bringing in portable cells. An assessment using numerical metrics like those suggested in the *Public Notice* would overlook these activities and would be of limited utility in assessing the effectiveness of industry's resiliency efforts.

Second, standardized numerical metrics inherently fail to recognize that each natural disaster or emergency is a unique event and that each event can impact communities in vastly different ways. The experiences during the 2017 hurricane season demonstrate this point. The devastation to electricity networks and damage to transportation networks in Puerto Rico and the U.S. Virgin Islands were two primary causes for prolonged wireless network outages in the

⁴⁵ *Public Notice* at 2.

aftermath of Hurricane Maria. Yet, none of the standardized numerical metrics suggested in the *Public Notice* would have accounted for these variables as affecting the resiliency of networks.

Moreover, developing standardized numerical metrics for measuring enhancements to municipal preparedness and restoration would be equally problematic. The resources available to and constraints placed upon municipalities vary greatly throughout the country. Further, disasters and emergencies can impact communities, wireless networks, and services in vastly different ways. For this reason, the signatories to the Framework and the local government and public safety officials from a diverse set of localities who developed the Best Practices made clear that these practices were not “rigid directives,” but rather “flexible tools service providers and local governments can utilize to coordinate joint efforts.”⁴⁶ Measuring the effectiveness of the Consumer Readiness Checklist may be impacted similarly by the nature of the event and the unique characteristics of the individual locality.

Third, the use of standardized numerical metrics likely would result in inaccurate representations of the Framework’s effectiveness. For example, a metric that measures the percentage of consumers covered by disaster-based roaming agreements would fail to account for provider investments to strengthen and densify their own networks. Such a metric similarly would fail to account for service continuity based on existing commercial roaming arrangements between providers—potentially creating incentives to develop disaster-based roaming agreements for purposes of metrics reporting where commercial roaming arrangements that may meet providers’ needs already exist. Further, such reporting requirements, depending on the nature of the data required, could potentially subject sensitive proprietary and security-related data to increased risk of cyberattacks and unauthorized disclosures.

⁴⁶ See Best Practices.

Fourth, the use of standardized numerical metrics could provide misguided incentives that could hinder resiliency efforts and chill participation in the Framework. For example, measuring the Framework's effectiveness through a uniform metric such as the percentage of consumers covered by roaming agreements or the number of instances of mutual aid could disincentivize actions by providers to advance resiliency in their own networks. Such a result might diminish the benefits derived as a result of the Framework's flexible approach, including efforts by wireless providers to develop new and innovative technologies and solutions to restore connectivity in the immediate aftermath of network outages. Even worse, burdensome reporting requirements may chill future participation in the Framework by additional wireless providers.

The Bureau thus should eschew any rigid approaches for measuring the Framework's use and effectiveness. Instead, the Commission should continue its existing approach of assessing the effectiveness of resiliency efforts on a flexible basis, ensuring that any evaluation is consistent with the commitments as laid out in the Framework. Such an approach will enable the Commission to identify the variables associated with each disaster and emergency and assess whether such variables were within industry's power to address.

B. The Commission Should Continue to Promote Awareness of the Framework.

CTIA commends the Commission for its efforts to promote awareness of the Framework and its outcomes, such as the Best Practices, through public news releases and social media. Moving forward, CTIA urges the Commission to continue to expand upon these efforts.

As awareness and familiarity with the Framework and its outcomes grow among public safety and state and local government partners, all stakeholders will be better positioned to prepare for future disasters and emergencies and implement lessons learned from past events. CTIA particularly encourages the Bureau to engage with industry and third party groups. These groups, and others like them, are well-positioned to connect the Framework and its outcomes to

federal, state, and local public safety partners who stand to benefit from awareness of these available tools.

C. Additional Stakeholders Could Be Encouraged to Voluntarily Implement Elements of the Wireless Cooperative Framework.

As CTIA addressed in response to the *2017 Hurricanes Response Efforts PN*, stakeholders across the communications ecosystem, including energy, broadcast, cable, and backhaul providers, could be encouraged to voluntarily implement those elements of the Framework that are relevant to their facilities and not already addressed in the formal and informal arrangements that wireless providers have with those stakeholders. The principles of collaboration and information sharing that the Framework encourages and facilitates can help to promote resiliency, preparedness, and public awareness of communications during emergencies and disasters, without expanding the wireless industry's Framework to additional stakeholders.

IV. CONCLUSION.

The performance of wireless networks during the historic 2017 hurricane season shows that CTIA's member companies are committed now more than ever to deploying robust and resilient wireless services and networks that millions of consumers rely upon during storms, natural disasters, and other wide-spread emergencies. As the *Public Notice* seeks comment on options for measuring the effectiveness of the Framework, the Bureau should continue to take a flexible, outcome-based approach to assessing the effectiveness of the Wireless Cooperative Framework.

Respectfully submitted,

/s/ Jennifer L. Oberhausen

Jennifer L. Oberhausen
Director, Regulatory Affairs

Thomas C. Power
Senior Vice President and General Counsel

Scott K. Bergmann
Senior Vice President, Regulatory Affairs

Matthew B. Gerst
Assistant Vice President, Regulatory Affairs

CTIA
1400 16th Street, NW
Suite 600
Washington, DC 20036
(202) 785-0081

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