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

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| In the Matter of | ) | |
| | ) | |
| Response Efforts Undertaken During 2017 Hurricane Season | ) | PS Docket No. 17-344 |
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# COMMENTS OF T-MOBILE USA, INC.


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## COMMENTS OF T-MOBILE USA, INC.

T-Mobile USA, Inc. ("T-Mobile")[1] submits these comments in response to the *Public Notice* in the above-referenced proceeding seeking comment on the resiliency of the communications infrastructure, the effectiveness of emergency communications, and government and industry responses to the 2017 hurricane season.[2] T-Mobile lauds the Federal Communications Commission's ("FCC" or "Commission") efforts to facilitate disaster recovery during the 2017 hurricane season and demonstrates herein that wireless networks generally performed well during the past hurricane season given the severe conditions.

## INTRODUCTION AND SUMMARY

The 2017 hurricane season was deemed "hyperactive" with a total of 17 storms and 10 hurricanes, 6 of which were considered major.[3] Indeed it was one of the top 10 most active hurricane seasons in history, and included four Category 4 or greater hurricanes – Harvey, Irma,

[1] T-Mobile USA, Inc. is a wholly-owned subsidiary of T-Mobile US, Inc., a publicly traded company.

[2] *Public Safety and Homeland Security Bureau Seeks Comment on Response Efforts Undertaken During 2017 Hurricane Season*, Public Notice, DA 17-1180 (rel. Dec. 7, 2017), https://ecfsapi.fcc.gov/file/1207118673392/DA-17-1180A1.pdf ("Public Notice").

[3] Jennifer Fabiano, *Timeline recounts the devastating 2017 Atlantic hurricane season and storms that made it memorable*, AccuWeather (Nov. 15, 2017), https://www.accuweather.com/en/weather-news/timeline-recounts-the-devastating-2017-atlantic-hurricane-season-and-storms-that-made-it-memorable/70003283. The average season typically has 12 named storms. *Id*.

Maria, and Nate.[4] Each of these storms struck within a month of each other.[5] Hurricane Harvey, the first Category 4 storm in the continental U.S. since 2004, reached a maximum wind speed of 130 miles per hour, and lasted 117 hours after making landfall, breaking the previous record of 54 hours from 1971.[6] Hurricane Irma shortly followed, reaching a maximum wind speed of 185 mph, the second strongest maximum winds of all time for an Atlantic hurricane.[7] She maintained these winds for a record-breaking 37 hours, and was the first Category 5 hurricane in the tropical Atlantic since 1989.[8] Hurricane Maria then followed, causing major damage to islands in the Caribbean, including Puerto Rico. According to AccuWeather Hurricane Expert Dan Kottlowski, "Maria will go down in history as one of the worst storms, if not the worst storm, to ever hit Puerto Rico."[9]

The Commission worked endlessly during the 2017 hurricane season to facilitate disaster recovery efforts. The FCC aided industry by providing regulatory relief where necessary to facilitate service restoration and by providing information to the public regarding disaster recovery efforts.

Like the Commission, T-Mobile is committed to ensuring high network reliability, competing with other wireless carriers on a daily basis to deliver on this commitment. To this

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[4] *See, e.g.*, Jonathan Erdman, *2017 Atlantic Hurricane Season Among Top 10 Most Active in History*, Weather.com (Oct. 2, 2017), https://weather.com/storms/hurricane/news/2017- atlantic-hurricane-season-one-of-busiest-september#/!.

[5] AJ Willingham, *A look at four storms from one brutal hurricane season*, CNN (Nov. 21, 2017), http://www.cnn.com/2017/10/10/weather/hurricane-nate-maria-irma-harvey-impact-look-back-trnd/index.html.

[6] *See* Jennifer Fabiano, *Timeline recounts the devastating 2017 Atlantic hurricane season and storms that made it memorable*, AccuWeather (Nov. 15, 2017), https://www.accuweather.com/en/weather-news/timeline-recounts-the-devastating-2017-atlantic-hurricane-season-and-storms-that-made-it-memorable/70003283.

[7] *Id*.

[8] *Id*.

[9] *Id*.

end, T-Mobile is proactive in its development of a resilient network that can withstand or recover quickly from numerous types of natural disasters, including wildfires, hurricanes, and other storms. Some of these measures include: comprehensive planning around network hardening; continuously adding capacity to its network to anticipate the future needs of consumers or possible network-impacting events; regular year-round testing of its incident command system; engaging in continuous assessments throughout the year; conducting an annual planning exercise; pre-staging equipment, such as fuel, generators, and antennas; and coordinating with other carriers, vendors and industry partners regarding mutual aid, such as backhaul and roaming support, in advance of potential disasters.[10]

Although any loss of service is unfortunate, occasional temporary outages in wireless networks in the wake of disasters are unavoidable. To minimize such outages, however, the major wireless carriers have taken several measures throughout the years, including:

- Investing billions of dollars over the years to fortify their networks.
- Developing best practices through the Alliance for Telecommunications Industry Solutions ("ATIS") Network Reliability Steering Committee ("NRSC"), the Network Reliability and Interoperability Council ("NRIC"), and NRIC's successor, the Communications Security, Reliability, and Interoperability Council ("CSRIC").
- Developing and implementing a Wireless Resiliency Cooperative Framework[11] which promotes the following actions during emergencies:
    - reasonable roaming under disaster arrangements when technically feasible;
    - mutual aid among wireless providers during emergencies;
    - enhancing restoration by convening with local government public safety representatives;
    - dissemination of a Consumer Readiness Checklist; and
    - improving public awareness and stakeholder communications on service and restoration status.

[10] *See* Ex Parte by T-Mobile USA, Inc., PS Docket No. 17-333 (Dec. 13, 2017) ("T-Mobile Ex Parte").

[11] Wireless Resilience Cooperative Framework, Public Safety and Homeland Security Bureau, Federal Communications Commission, https://www.fcc.gov/wireless-resiliency-cooperative-framework (last visited Jan. 16, 2018).

The voluntary efforts of the commercial mobile radio services ("CMRS") industry, coupled with the competitive nature of the market, generally worked well to ensure resilient wireless networks and the rapid recovery of those portions of wireless networks damaged during the 2017 hurricane season.[12] The Commission, through its Disaster Information Reporting System ("DIRS"), collected extensive information regarding the performance of wireless networks in the wake of these hurricanes.[13] This information confirms that overall wireless networks performed remarkably well during the 2017 hurricane season considering the varying circumstances.[14] It is also worth noting that, while reporting includes information on the number of sites that are not operational or "down," this does not mean that a tower has been damaged or destroyed, but generally means loss of power or backhaul.

Although wireless networks suffered outages immediately after the 2017 hurricanes, wireless carriers responded quickly to restore service.[15] Lengthy delays in service restoration during the past hurricane season were generally not due to a failure of wireless infrastructure, but could be ascribed to the limited availability of commercial power and/or failures in third-party backhaul networks (coupled with the inability of the power and backhaul providers to restore these networks quickly).[16] In particular, the complete and extended failure of the power grid and most of the fiber backhaul facilities in Puerto Rico, combined with the fact that Puerto Rico is an

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[12] T-Mobile Ex Parte, Attach. at 3.

[13] *See* Disaster Information Reporting System, Public Safety and Homeland Security Bureau, Cybersecurity and Communications Reliability Division, Federal Communications Commission, https://www.fcc.gov/general/disaster-information-reporting-system-dirs-0 (last visited Jan. 16, 2018).

[14] *See* Marguerite Reardon, *How the wireless carriers fared during Hurricane Harvey*, CNET (Sept. 3, 2017), https://www.cnet.com/news/hurricane-harvey-phone-service/ (stating that only 4 percent of the 7,804 cell sites in Harvey's path experienced outages during the storm).

[15] *See* T-Mobile Ex Parte, Attach. at 3 (explaining that T-Mobile's network was restored to "normal" in 2-5 days, excluding Puerto Rico and the U.S. Virgin Islands).

[16] *See infra* Section III.

island, presented challenges to disaster response that would not necessarily be present in the continental U.S. The geography of the island itself also proved extremely challenging, particularly the main mountain range, "La Cordillera Central" dividing the island, and poor weather that continued after the hurricanes.[17]

Experience gained as a result of the 2017 hurricane season suggests that the FCC should revisit DIRS and modify the tool to collect information that is more reflective of restoration efforts for the entire communications networking ecosystem. Wireless carriers generally focus service restoration efforts in the wake of natural disasters on restoring a "coverage layer" of service to geographic areas quickly, which can be accomplished without restoration to every cell site within a carrier's network.[18] This focus is driven by wireless carriers' determination to reconnect as much of the population as possible back to the network. Current DIRS reports do not truly reflect this service restoration progress as the reports focus on the number of cell sites that are operational, rather than the scope of geographic coverage. Thus, the Commission should modify DIRS to reflect the population without any service in a geographic area. The Commission also should explore opportunities to gather and disseminate information regarding backhaul outages and restoration efforts given the importance of these networks for the provision of wireless services.

## I. THE FCC AND T-MOBILE TOOK QUICK ACTION TO FACILITATE RAPID RECOVERY BY COMMUNICATIONS NETWORKS IMPACTED DURING THE 2017 HURRICANE SEASON.

As highlighted above, the Commission's efforts to facilitate disaster recovery during the 2017 hurricane season were quick and comprehensive. The Commission granted over 200

[17] *Puerto Rico's Topography*, http://welcome.topuertorico.org/reference/topo.shtml (last visited Jan. 16, 2018).

[18] Wireless carriers are able to fully restore service to a geographic area without bringing all cell sites back online.

requests for special temporary authority ("STAs") and issued over 30 public notices and orders, many of which permitted the flexible use of spectrum or other non-standard actions to support disaster recovery.[19] The FCC also assisted in disseminating information regarding the need for access to fuel, generators, and power from the electrical grid. Further, the Commission issued over 85 communications status reports detailing impacts to the communications infrastructure[20] and worked effectively with its government partners to facilitate restoration efforts.

T-Mobile shared the Commission's dedication and, overall, its response was rapid and decisive. For Puerto Rico alone, T-Mobile utilized more than a dozen cargo planes and multiple barges packed full of supplies and equipment, including trucks, cells-on-wheels, and numerous portable generators.[21] T-Mobile's efforts were not limited to transporting supplies it needed for service restoration. T-Mobile made room on its cargo planes for generators and supplies needed by the Department of Homeland Security and other carriers.[22] T-Mobile even loaned a large generator to the Federal Aviation Administration, which helped facilitate the start of and continued operations at the San Juan airport. [23] T-Mobile also accounted for each of its more than six hundred local employees, shipped food and water, and partnered with local entities to help some of the devastated communities.

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[19] Public Notice at 2 (citing *Public Safety and Homeland Security Bureau Temporarily Waives Location Accuracy Obligations for 911 Calls for Certain Providers in Areas Affected by Hurricane Maria*, Public Notice, DA 17-997 (Public Safety and Homeland Security Bureau, Oct. 10, 2017); *Wireless Telecommunications Bureau and Public Safety and Homeland Security Bureau Extend Filing and Regulatory Deadlines and Streamline Environmental Notification Process for Areas Affected by Hurricane Maria*, Public Notice, DA 17-983, (Wireless Bureau, Public Safety and Homeland Security Bureau, Oct. 6, 2017)).

[20] Public Notice at 2.

[21] Neville Ray, *On the Road to Recovery in Puerto Rico* (Oct. 27, 2017), https://newsroom.t-mobile.com/news-and-blogs/puerto-rico-network.htm (Neville Ray Blog).

[22] T-Mobile also was able to loan spare generators to other carriers.

[23] *See* Neville Ray Blog.

## II. WIRELESS COMMUNICATIONS INFRASTRUCTURE PROVED VERY RESILIENT DURING THE 2017 HURRICANE SEASON GIVEN THE SEVERE CONDITIONS.

T-Mobile took steps long before this unique hurricane season to ensure network resiliency and acted promptly in the aftermath of the storms to restore service quickly. As noted above, prior to the hurricane season, T-Mobile invested billions of dollars to fortify its network and worked with other carriers to develop best practices and implement a Wireless Resiliency Cooperative Framework to facilitate disaster recovery.[24] These efforts limited the impact of Hurricanes Harvey, Irma, and Nate and promoted rapid recovery.[25]

T-Mobile had more than 500 employees involved in the recovery process, engaged personnel resources from outside the company, and deployed more than 2000 generators as part of the hurricane recovery process. Specific details regarding the recovery from the four major hurricanes are provided below.

### A. Hurricane Harvey.

As highlighted above, Hurricane Harvey was the costliest hurricane in U.S. history, causing approximately $200 billion in damage.[26] That said, more than 85% of T-Mobile's network remained operational in the aftermath of this Category 4 storm.[27] Additionally, the network was restored to normal operating status within 5 days of the storm.[28] Because of familiarity with storm and flooding impacts in Texas, T-Mobile built sites on platforms in areas

[24] *See supra* Section I.

[25] Wireless networks damaged by Hurricane Maria are largely repaired, but service availability remains impacted by the lack of commercial power and backhaul. Adam Rogers, *In Puerto Rico, No Power Means No Telecommunications*, Wired (Oct. 10, 2017), https://www.wired.com/story/in-puerto-rico-no-power-means-no-telecommunications.

[26] Jonathan Belles, *Harvey Could Be America's First $200 Billion Hurricane*, Weather.com (Nov. 3, 2017), https://weather.com/storms/hurricane/news/2017-11-03-hurricane-200-billion-dollar.

[27] T-Mobile Ex Parte, Attach. at 5.

[28] *Id*.

prone to flooding and storm surges, allowing these sites to perform exceptionally well in the wake of the storm. Furthermore, ongoing densification of the network in Houston allowed T-Mobile to optimize operational cell sites to provide coverage to areas impacted by damaged sites. This provides coverage even when a significant percentage of sites are not operational. Finally, there were minimal impacts from loss of commercial power and backhaul due to the more modern infrastructure used in Texas.[29]

**B. Hurricane Irma.**

At one point a Category 5 hurricane, Hurricane Irma was the strongest observed hurricane since Hurricane Wilma in 2005. The storm had devastating impacts on many Caribbean islands and caused significant damage in Puerto Rico, but fortunately weakened before hitting Florida. Hurricane Irma caused more than $65 billion in damage over a wide area. Restoration efforts spanned from south Florida to Puerto Rico.[30] Geographic coverage for T-Mobile was substantially restored to impacted areas within 5 days, with full recovery in slightly more than 10 days. Commercial power outages associated with this storm, while widespread, were not as lengthy as those associated with other 2017 storms and therefore T-Mobile was able to restore service quickly. Supplemental generators, Cells on Wheels ("COWs"), and satellite and terrestrial wireless backhaul links were quickly deployed to ensure widespread geographic coverage. A solid coverage layer was quickly re-established to the geographic area covered by the T-Mobile footprint long before all cell sites were repaired. The large volume of cell sites in southern Florida facilitated network optimization efforts to close coverage gaps due to damaged facilities or in areas with limited commercial power or backhaul.

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[29] *Id*.

[30] Rene Rodriguez, *Hurricane Irma damage could be as high as $65 billion*, Miami Herald (Sept. 19, 2017), http://www.miamiherald.com/news/weather/hurricane/article174153646.html.

### C. Hurricane Maria.

Hurricane Maria was an exceptional event. The storm has been characterized as the worst natural disaster in Puerto Rico's history and was the tenth most intense Atlantic hurricane ever.[31] It caused more than $100 billion in damage and decimated the island's power grid and backhaul networks.[32] The impact was exacerbated because the storm followed closely on the heels of Hurricane Irma. This one-two punch made this natural disaster truly unique.

*Impact on Power Grid*. "Puerto Rico's power grid was notoriously dysfunctional and in disrepair. Years of mismanagement, combined with a lack of basic maintenance and modernization, left the grid uniquely vulnerable to disruption."[33] Power plants in Puerto Rico average 44 years old, as compared to an industry average of 18 years.[34] The Puerto Rico Electric Power Authority, the island's sole power supplier, is bankrupt and called its system "degraded and unsafe" after "years of under-investment."[35] These conditions made the power grid extremely susceptible to hurricane damage. In fact, the commercial power grid remains down in many areas.

*Impact on Backhaul*. T-Mobile's primary backhaul provider in Puerto Rico relied heavily on aerial fiber for its network. Fiber backhaul is capable of providing the enormous capacity necessary to meet the ever increasing demand for data, and, for the most part, is highly

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[31] Daniel Chaitin, *Hurricane Maria cracks top-10 hurricane list as it strengthens and heads to Puerto Rico*, Washington Examiner (Sept. 19, 2017), http://www.washingtonexaminer.com/hurricane-maria-cracks-top-10-hurricane-list-as-it-strengthens-and-heads-to-puerto-rico/article/2634982.

[32] *See* Jeff Masters, *Hurricane Maria Damage Estimate of $102 Billion Surpassed Only by Katrina*, Weather Underground (Nov. 22, 2017), https://www.wunderground.com/cat6/hurricane-maria-damages-102-billion-surpassed-only-katrina.

[33] William J. Berger, *Puerto Rico's Future Depends on Solar*, RealClear Energy (Dec. 21, 2017), http://www.realclearenergy.org/articles/2017/12/21/puerto_ricos_future_depends_on_solar_110269.html.

[34] Kevin Lui, *Puerto Rico Could Be Left Without Electricity for Months. Here's What to Know*, Time (Sept. 22, 2017), http://time.com/4951048/puerto-rico-power-blackout-hurricane-maria-electricity-prepa.

[35] *Id*.

reliable and generally considered the "gold standard" for backhaul services. Accordingly, more than 95% of T-Mobile's network in Puerto Rico was deployed using leased fiber-based backhaul. Because the fiber backhaul was largely aerial service co-located with the power lines, the aerial fiber plant was decimated by the hurricanes along with the power grid. As a result, a significant portion of T-Mobile's recovery efforts were based on the need to deploy alternative backhaul solutions while fiber is being restored.

*Impact on Wireless Infrastructure*. Given the catastrophic nature of the hurricane, most wireless communications networks were unavailable in the immediate aftermath, with approximately 95 percent of cell sites out of service.[36] T-Mobile undertook numerous efforts to restore communications quickly. The biggest challenge was restoring power and backhaul to cell sites. Because the restoration of existing power and backhaul networks was extremely slow, T-Mobile had to rely almost wholly on alternative means, such as temporary generators (which required constant refueling) for power,[37] other LEC and CLEC providers for new wired backhaul connectivity, and new satellite communications and microwave links T-Mobile itself established for wireless backhaul. T-Mobile focused on providing a coverage layer by restoring key locations first and adjusting coverage with available cell sites to provide geographic coverage to many areas served by sites that were inoperable.

Logistical efforts associated with service restoration were severely hampered by damage to the San Juan airport, seaports, and roads. T-Mobile utilized numerous cargo aircraft loaded

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[36] *See* Communications Status Report for Areas Impacted by Hurricane Maria, Federal Communications Commission (Sept. 21, 2017), https://apps.fcc.gov/edocs_public/attachmatch/DOC-346840A1.pdf.

[37] As of January 20, 2018, approximately 40% of T-Mobile's sites are currently running on temporary, mobile generators. This figure will continue to fluctuate as commercial power restoration stabilizes. As the Commission knows, generators are not designed as long-term solutions to commercial power outages. To make things worse, many of the generators being used in Puerto Rico need repair or replacement due to their extensive use to date.

with supplies needed for restoration efforts, including one that landed moments after the airport re-opened. As part of voluntary mutual aid efforts, T-Mobile provided space on these aircraft to transport generators needed for a competitor to restore service.

Despite these problems, it is important to note that the physical infrastructure associated with wireless networks in Puerto Rico generally withstood Hurricanes Irma and Maria. For example, less than 2% of T-Mobile's towers were destroyed. Although winds caused minor damage to most sites, causing a need for some antenna replacements, modifications, and readjustments, this damage was repaired fairly quickly. Unfortunately, as noted above, service remained unavailable after these repairs in many areas generally due to the combination of a lack of commercial power and the destruction of aerial backhaul networks.

**D. Hurricane Nate.**

Hurricane Nate was the fourth Atlantic hurricane to strike the U.S. in 2017, and actually had two U.S. landfalls, first striking Louisiana and subsequently making landfall in Mississippi. The storm caused more than $835 million in damage, but had very little impact on T-Mobile's network.[38] T-Mobile's network was approximately 99% operational at the height of the event. The minimal impact from this storm may be attributable to modernization of the power and backhaul infrastructure in this region post-Hurricane Katrina.[39]

[38] Daniel Uria, *As hurricane season ends, 2017 settles firmly into record book*, San Angelo Now (Nov. 30, 2017), http://www.sanangelonow.com/as-hurricane-season-ends-2017-settles-firmly-into-record-book.

[39] Issie Lapowsky, *Harvey Shows Progress On Emergency Communications Since Katrina*, Wired (Aug. 29, 2017), https://www.wired.com/story/harvey-shows-progress-on-emergency-communications-since-katrina.

## III. LENTGHY WIRELESS NETWORK OUTAGES WERE DUE TO PROBLEMS WITH COMMERCIAL POWER AND AERIAL BACKHAUL NETWORKS.

In most areas impacted by the 2017 hurricane season, T-Mobile restored coverage to the areas served prior to the storms within 2-5 days of impact.[40] Texas, Louisiana, Mississippi, and Florida had well-maintained and updated power grids along with diverse backhaul networks for use by wireless providers, including significant amounts of buried, as opposed to aerial power and backhaul.

Recovery in Puerto Rico has taken longer, however, due to a wide variety of factors discussed above. In particular, the pace of wireless service restoration was negatively impacted by the state of the island's commercial power grid. The Puerto Rico power grid simply was not prepared for a major hurricane, let alone the dual impact of Hurricanes Irma and Maria striking within one month of each other. As reflected in the FCC's Hurricane Maria Status Reports, widespread power outages continue in Puerto Rico. Three months after Hurricane Maria, only 70 percent of the power grid capacity had been restored.[41]

The two hurricanes also decimated the backhaul fiber networks serving the island. Virtually all fiber backhaul networks were destroyed. Because these networks were largely aerial, they were very susceptible to storm damage. Until these networks were repaired (or alternative backhaul networks established), service from wireless communications reliant on these aerial networks remained unavailable.

T-Mobile assumed a leadership role in wireless industry partnership collaboration and moved quickly to restore service in Puerto Rico by bringing in generators and alternative

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[40] T-Mobile Ex Parte, Attach. at 3.

[41] Jack Holmes, *Here's What Life is Like in Puerto Rico 3 Months After Hurricane Maria*, Esquire (Dec. 21, 2017), http://www.esquire.com/news-politics/a14474788/puerto-rico-3-months-after-hurricane.

backhaul communications solutions. Generators are designed to be temporary in nature and extended reliance on these resources requires constant refueling and maintenance. Alternative backhaul solutions (including microwave solutions) take time to design and deploy. For example, T-Mobile has had to design a replacement microwave backhaul network from scratch and adapt to network conditions as they evolved. Greater insight into the restoration efforts of backhaul providers and power companies would further facilitate restoration efforts of wireless carriers, who are customers of these companies.

Finally, although the voluntary Wireless Resiliency Cooperative Framework worked well, it is wireless-centric and promotes a tilted outlook of overall telecom restoration. The Commission may wish to consider whether a similar approach – covering the entire communications ecosystem, including backhaul providers – should be developed. Facilitating greater cooperation and information exchange between wireless and backhaul service providers would allow each to use resources as effectively as possible. For example, wireless providers could deploy temporary backhaul solutions in areas where it is apparent that backhaul will be out for an extended period, rather than in areas that are likely to be quickly restored. This collaboration would provide faster and more complete service restoration.

## IV. THE COMMISSION SHOULD REVISE ITS DISASTER INFORMATION REPORTING SYSTEM TO MORE ACCURATELY REFLECT SERVICE AVAILABILITY.

The Commission's DIRS reports focus on the percentage of cell sites out of service. As explained above, this fails to accurately reflect the geographic and population coverage of wireless networks in the aftermath of disasters. Instead, the Commission should evaluate coverage data to determine the percent of the population to which service has been restored. T-Mobile is able to provide this information on a county-by-county basis comparing the percentage

of coverage recovered relative to pre-event coverage. In order to meet service demand, cellular networks are deployed with both coverage and capacity sites, so service may be available where capacity sites are inoperable. Recovery efforts often focus first on coverage sites to provide consumers with basic connectivity, with additional capacity sites restored later. The current reporting mechanism merely shows the percentage of sites that are not operational and may not accurately depict the actual coverage available. In many cases, reports can show a significant percentage of sites as not operational, while the coverage layer is fully, or nearly fully, restored and communications are generally available. Thus, the Commission should consider changes to its DIRS reporting to provide a more accurate depiction of actual coverage.[42]

T-Mobile agrees with the Commission that it is important for consumers to be aware of coverage availability in the aftermath of a disaster. Carriers generally make coverage maps and other important information about restoration efforts available.[43] The FCC should also make coverage information (as described above) available, provided site locations and technical specifications are not disclosed for security and competitive reasons.

Based on its experiences during the recent hurricanes, T-Mobile also urges the Commission to limit new requests for information in the wake of future natural disasters. Wireless carriers should not be forced to divert limited resources away from disaster recovery to information gathering. Although T-Mobile recognizes the importance of reforming the processes for data gathering, the aftermath of a natural disaster is not the appropriate time to implement new changes or for various agencies to request different types of information.

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[42] The Commission has not defined a level of service for coverage or buildout requirements. Accordingly, reporting should be based on levels determined by each carrier to provide an accurate coverage map relative to pre-event coverage.

[43] *See, e.g.*, Press Release, *Hurricane Maria: Update for Customers*, T-Mobile News & Blogs (Sept. 21, 2017), https://newsroom.t-mobile.com/news-and-blogs/hurricane-maria-impacted-customer-update.htm.

Finally, the Commission should gather and disseminate information regarding backhaul outages and restoration efforts given the importance of these networks for the provision of wireless services.

## CONCLUSION

T-Mobile appreciates the opportunity to provide comments on efforts leading up to and during the 2017 hurricane season. Despite the challenges presented by this past season, wireless networks are generally resilient. Network "hardening" will continue through effective competition and improved best practices. The Commission should streamline government reporting to limit multiple requests for information and revise the DIRS reports as described above. Doing so will allow them to more accurately reflect the industry's commitment to consumers, and be more representative of actual coverage restored.

Respectfully submitted,

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