



GOVERNMENT OF PUERTO RICO

Telecommunications Regulatory Board
Office of the Chairwoman

January 22, 2018

Hon. Ajit Pai
Chairman
Federal Communications Commission
445 12th Street SW,
Washington, DC 20554

Dear Chairman Pai:

The Puerto Rico Telecommunications Regulatory Board (PRTRB), hereby submits its comments regarding the Public Safety and Homeland Security Bureau questions in the proceeding under PS Docket No. 17-344.

Hurricane Maria, a Category 5 storm, hit Puerto Rico on September 20, 2017, passing diagonally through the Island on a southeast-northwest trajectory. The impact of the storm was island-wide, resulting in 91% damage as of September 24, 2017, to the private telecommunications infrastructure, primarily antennas and fiber affecting the government, retail, banks, pharmaceutical, developers, food, transportation and other businesses. It also resulted in the interruption of the internal public communications of the Puerto Rico Power Authority, the Police Department, the Ports Authority, several municipalities and entities that are first responders in an emergency scenario. As of today, the private telecommunications damages are estimated to be more than one point five billion dollars. One hundred plus days after the hurricane, 91.76% of the cell sites are operational.

Below are our comments for the benefit of the Commission:

A. Questions Regarding Impacts to Communications Infrastructure



1. What were the major causes of communications outages due to the hurricanes? Were there unique factors that affected outages and/or resilience during any particular hurricane?

In Puerto Rico, the major causes of communications outages due to Hurricanes Irma and María were antenna loss of power, cuts to fiber and the theft of copper. The principal factor that affected the outages and/or resilience during the hurricanes was the geographic location of the Island and its topography.

Also, the hurricane affected the submarine cable landing station serving Telecom Italia's Seabone network, which had to be powered down due to flooding. This affected connectivity to several South American countries and left the system partially inoperative and further complicated the handling of data and voice traffic to the exterior.

2. What were the cascading effects of communications outages? Did communications service outages have impacts on supervisory control and data acquisition systems (SCADAs) of other critical infrastructure?

The cascading effects of the communications outages were that the government was without communication capability, including agencies that provide essential services to the people, like Puerto Rico Electric Power Authority (PREPA), Puerto Rico Aqueduct and Sewer Authority (PRASA), Puerto Rico Ports Authority, Department of Public Security, among others.

3. To what extent was the communications infrastructure resilient to the hurricanes?

The telecommunications towers in Puerto Rico withstood the hurricane well; only less than two

percent were damaged. However, cell site antennas fell or became out of alignment.

What methods were employed prior to hurricane landfall to address infrastructure resiliency?

From the PRTRB perspective as the regulatory entity and as leader of the *Emergency Support Function # 2* (ESF # 2) in charge of telecommunication support functions, immediately the Governor declared a state of emergency and we activated our emergency protocol. An Emergency Operations Center at our facilities coordinated with all designated personnel from telecommunications companies, assuring that they were prepared to manage any situation, and by working together with the PRTRB ensured that any situation that needed to be handled with other agencies of the government would be correctly and timely channeled.

4. Are there industry best practices that address communications operations in high risk areas (e.g., flood, high-wind areas)? If so, were these practices implemented and did they prevent and/or mitigate outages? To what extent do these best practices involve cross-industry and/or government participation and was such participation effective?

The PRTRB signed a Cooperation Agreement together with the Telecommunications Industry Committee for Emergency Management (CITME), comprised of representatives of all the telecommunications and cable television companies operating in Puerto Rico, to join forces between public and private entities in order to restore and protect the telecommunications and cable television infrastructure, and satisfy communication priorities during disasters or emergencies.

Also, as part of the PRTRB's efforts to assist with restoration of telecommunications infrastructure and services, we sent the Electric Power Authority



(PREPA or AEE) an Inter-Agency Agreement, which recognizes the criticality of the lack of electrical power for telecommunications operations. To restore infrastructure promptly, it is agreed to include within the Inventory of Critical Charges of the AEE, the critical facilities of the telecommunications and cable television industry as well as other identified critical communications facilities that support response and recovery efforts, such as radio frequency antenna facilities, repeaters, emergency alert systems, etc.

B. Questions Regarding the FCC's Response

1. Are there actions that the FCC could take to improve the support and coordination it provides to industry and government (federal and SLTT) partners? For example, was the FCC support to Emergency Support Function #2 effective?¹

The PRTRB believes a regional office of the FCC is needed in Puerto Rico for more efficient support and coordination of all response efforts in an emergency.

2. Are there any actions that the FCC should consider to improve the communications industry response to hurricanes? If so, what would those be?

In the matter of Puerto Rico, the FCC should take into consideration the geography of the Island and make data requirements mandatory.

¹ There are fifteen Emergency Support Functions (ESFs), which provide for coordinated federal response to incidents. The FCC supports ESF #2 which focuses on response related to the communications infrastructure. See FEMA, *Emergency Support Function Annexes*, <https://www.fema.gov/media-library/assets/documents/25512> (last visited Dec.7, 2017).

3. The FCC provided information to the industry and the public before and during the course of hurricane season. For example, the FCC released public notices providing information, including but not limited to, emergency contact information for the FCC's 24/7 center and process guidance on seeking waivers/STAs.² The FCC also created event-specific webpages to share information such as communications status reports, public notices, and orders.³ Was this information helpful?

The information provided by the FCC was helpful. Nonetheless, the PRTTB had to issue an Administrative Order on October 10, 2017, ordering the companies certified and registered by the PRTTB to provide more detailed information on the recovery of critical telecommunications infrastructure. The Board ordered this detailed information be provided daily until otherwise ordered, and indicated that said information would be handled in a confidential manner. In addition, the Administrative Order requested the plans of lifting of the individual telecommunications of each provider (healing plans), with the purpose of daily mapping the telecommunications service and infrastructure reconstruction progress.

Is there additional information or assistance that the FCC should provide at the beginning or during an event?

The FCC could improve coordination between broadcasters and the telecommunications industry in emergencies.

² See, e.g., FCC, *FCC Provides 24/7 Emergency Contact Information Amid Hurricane Harvey*, Public Notice, 32 FCC Rcd 6682 (PSHSB 2017).

³ See, e.g., FCC Hurricane Maria (last updated Oct. 31, 2017), <https://www.fcc.gov/maria>.

4. How effective were the FCC's responses with respect to RFIs, RFAs, and requests for STAs and waiver requests? Do the processes for handling these requests need improvement and, if so, how can they best be improved?

With respect to waiver requests, the FCC was very responsive, establishing a single point of contact.

5. To what extent did the data provided by DIRS aid response efforts? Is there additional information, including licensee information, which would improve response and coordination efforts?

The PRTRB believes that DIRS should be mandatory and provide data coverage in the affected areas. We believe that cooperation on the provision of information needs to be improved.

6. The FCC monitors radiofrequency spectrum via deployed and/or fixed sensors to determine operational status of licensees. Were the reports related to such efforts effective in improving response of federal and SLTT partners? Should the FCC take actions to provide awareness and education on these capabilities?

Yes, the FCC should provide awareness and an educational campaign.

7. The FCC provides assistance to industry, first responders, and others in coordinating ad hoc emergency uses of spectrum in the affected areas. To what extent was the coordination process effective?

The coordination process was very effective in the use of experimental technology and the waiver request process. In Puerto Rico, we used the Loon Project with great results.

8. Were there interoperability issues among local spectrum users and those that arrived to assist in response? If yes, to what extent and how were they resolved? To what extent was unlicensed spectrum used and were there interoperability issues?

To our knowledge, there were no interoperability issues.

9. Should the FCC publicly post information about interoperable channels assignments to facilitate spectrum coordination?

Yes, it would expedite processes.

C. Questions Regarding Communications Service User Experience

1. To what extent did government agencies issue emergency alerts to the public, particularly over the Emergency Alert System (EAS) and the Wireless Emergency Alerts (WEA)? What other alerting methods were used? Were those communications effective? For example, were the alerts easy to understand, read, and geographically accurate? Were they accessible to people with disabilities and sent in languages other than English? Were there consumers that the alerts did not or could not reach? If public safety officials chose not to use EAS or WEA, why not?

The government agencies issued alerts to the public through EAS, WEA and they were easy to understand, read and were geographically accurate. It is important to note that during Hurricane María almost all broadcasters in Puerto Rico went off air, as did cell sites, after which people could not receive the alerts.

2. Were consumers able to effectively reach 911 services via voice and/or text (where text-to 911 was available) during and after the hurricanes? If

not, why not? Are there actions that the FCC should take to improve 911 resiliency and reliability during events such as the hurricanes?

To the extent end-user customers were able to originate a telephone call, our understanding is that 911 was available.

3. Were emergency communications services available to people with disabilities and others with specific communications needs? What actions can be taken to improve emergency communications for these communities?

The Telecommunications Relay Service (TRS) was available.

4. Were consumer complaints related to communications outages responded to by service providers in an appropriate and expedited manner? Is there any action that the FCC should take to improve this process?

The telecommunications industry continues to give customer credits for outages resulting from the devastating hurricanes.

5. To what extent were the operations of Public Safety Answering Points (PSAPs) affected by the hurricanes? Were PSAPs able to receive 911 calls during the storms, and if so, did redundancy and diversity in the circuits to the PSAPs contribute significantly to 911 reliability? Were PSAPs able to handle the call volume before, during and after landfall? Did PSAPs receive prioritized restoration for their service outages?

The PSAPs were severely affected, but remained operational.

6. To what extent were first responders able to use their own wireless communications networks and

devices? If not, what alternatives were used, if any? What was their experience with land mobile radio and microwave radio services in each hurricane?

First Responders could not use their own wireless communications networks and devices. The alternatives used were runners, ham radio, amateur radio (KP4), copper wireline, satellite microwaves and all analogue technology, including broadcasting and VHF hand held units.

7. The FCC oversees the National Security/Emergency Preparedness (NSEP) priority service programs, which provide for service restoration and provisioning and mobile wireless and wireline priority.⁴ To what extent were the priority service programs effective? Did NSEP users receive improved performance (higher percentage of call completion) when using the Government Emergency Telecommunication Service (GETS) and Wireless Priority Services (WPS)⁵ compared to non-prioritized voice calls? If not, why not? Were GETS calling cards distributed across emergency responder organizations? Were emergency responder cell phones equipped with WPS? Are there any actions that the FCC could take to improve the effective use of the priority services programs?

We've confirmed that from September 16 to 26, 2017, for Hurricane Maria, there were more than 200 GETS calls and 511 WPS calls placed by users in Puerto Rico and U.S. Virgin Islands, and the vast majority were successfully completed. The OEC [The DHS Office of Emergency Communications] received requests for 17 GETS and 80 WPS expedited service activations, along with 20 emergency TSP provisioning requests during Hurricane Maria. The Board recommends that

⁴ See 47 C.F.R. § 64, Appendices A and B.

⁵ WPS is also referred to in the Commission's rules as Priority Access Service (PAS). See 47 C.F.R. § 64, Appendix B.

the FCC coordinate with and notify state agencies in a timely manner to better address emergency situations.

8. To what extent were response efforts facilitated by amateur radio operators? Going forward, should efforts be made to increase the use of amateur radio services in connection with the planning, testing and provision of emergency response and recovery communications?

The amateur radio operators helped very much in the response efforts and we think that their participation should be part of the response and recovery of Island communications.

D. Questions Regarding Communications Service Provider Experience

1. To what extent were service providers able to pre-position equipment, supplies, and/or resources close to the affected areas in advance of each hurricane? How did this impact the continued availability of communications services or facilitate recovery?

Service providers pre-positioned equipment in the U.S. mainland. However, this was not effective in ensuring the continued availability of communications in the Island.

2. Did small and rural providers, including those serving Puerto Rico and the U.S Virgin Islands, face any unique challenges in preparing for, responding to and recovering from the hurricanes?

The providers in Puerto Rico are facing the following challenges:

- The companies have had to invest large sums of money so that future damages to their infrastructure are minimized
- logistics

- mountain systems
- tropical weather
- disadvantage in availability of equipment and materials. As an island, everything arrives through ports and airports, including our municipal islands, Vieques and Culebra, as opposed to the U.S. mainland states that can transport equipment and materials by roads.

3. Was radio frequency information shared among service providers? Were there instances of interference and were they resolved in a timely and effective manner?

To our knowledge, there was no radio frequency information shared among service providers. However, the providers did sign Roaming Agreements and Non-Disclosure Agreements (NDA). These service providers forewent competitive concerns and worked together toward their shared goal of providing services to the people. They were able to reach historic agreements such as those mentioned above, allowing companies to use the networks of other providers (roaming) as an alternative to providing communication to customers, depending on how they lifted the service, as well as sharing costs of repair and equipment, particularly generators. In turn, and as part of the agreements reached, if a company brigade identified a tower for repair of its own antenna, they also repaired, if possible, the antenna of another company.

4. How could DIRS notices sent to participating communications providers during the storms be improved? Were there any problems/issues in reporting outage information into DIRS? Should DIRS be modified to improve user experience, and if so, how?

The information provided through DIRS should be mandatory and should be shared with state regulators, with the respective NDA.

5. What were the most effective means to restore connectivity to the communications infrastructure (e.g. backhaul, last mile) and how long did it take to do so?

It is an ongoing process, but what worked best was an industry-coordinated effort along with the Board, tower owners and other infrastructure participants. Last mile and back haul is going to be a challenge because of geography and the cost involved, coupled with sixty percent infrastructure on generators 115 plus days after the hurricane.

6. Were communications services, such as satellite services, mobile ad-hoc networks, Wi-Fi services, mesh-based communications architectures, experimental projects or other services/technologies used and effective in providing connectivity when other services were limited or down? Should the FCC encourage inclusion of these services in future mitigation plans?

The PRTRB is convinced that these technologies should be included in future mitigations plans, and we in Puerto Rico will surely encourage it.

7. Were service providers able to route 911 calls effectively to PSAPs or alternate numbers permitted under the rules?⁶

Yes.

8. What were the obstacles to rapidly restoring communications systems? To what extent did these impediments impact and/or extend the duration of outages? Were FCC efforts to address the impediments helpful?⁷

⁶ See 47 C.F.R. § 20.18 (b).

⁷ See *supra* Introduction.

The obstacles faced to rapidly restore the communications systems in Puerto Rico were: lack of electricity, lack of physical access to sites, multiple incidents of copper theft, fiber optic cuts, theft of generators and fuel, all of which delayed recovery efforts and increased the costs.

9. Were there challenges with the use of back-up power for network equipment? Are there ways to improve the ability of communications infrastructure to operate when commercial power is lost?

The costs and challenges are substantial and include, but are not limited to: getting generators delivered to the Island and the subsequent delivery of those generators to sites; getting fuel to generators; having enough generators to cover the emergency; preventing theft of generators and diesel fuel; and, maximizing the usable life of generators. Companies need to consider having a power backup alternative outside the Island's electrical company.

10. To what extent was the Wireless Resiliency Framework and each of its elements, i.e. providing reasonable roaming under disaster agreements, providing mutual aid to carriers, enhancing municipal preparedness, increasing consumer readiness, and posting data in DIRS, effective in each hurricane-impacted area?⁸ Were there examples of positive impacts and/or deficiencies in the utilization of the Framework, and, if so, what should be improved?

A positive impact was the creation, on the initiative of the PRTTB and the Puerto Rico

⁸ See Letter from CTIA, AT&T Services, Inc., Sprint, US Cellular, T-Mobile USA, and Verizon to Marlene H. Dortch, Secretary, Federal Communications FCC (April 27, 2016). This framework was adopted by the FCC. See *Improving the Resiliency of Mobile Wireless Communications Networks*, et al., Order, 31 FCC Rcd 13745 (2016).

Innovation and Technology Services (PRITS), in coordination with the Governor of Puerto Rico, a dedicated Command Center for telecommunications where all restoration efforts were centralized. It was operational seven days a week with staff from the PRTRB, PRITS, suppliers (technical, legal and executive officers), tower owners, FEMA, Homeland Security and other dedicated personnel, and provided for creation of the first interactive map of critical infrastructure in Puerto Rico.

11. Does the market and/or government, currently offer sufficient incentives to encourage the build-out and maintenance of resilient communications infrastructure? Are there actions that the FCC should take to encourage industry to build and maintain a resilient communications infrastructure?

Currently there are not sufficient incentives. We believe the FCC can help by establishing under the Universal Service Fund a High Cost Fund/Insular Fund. Puerto Rico confronts poor telecommunications and broadband penetration rates in comparison to the U.S. mainland due to the high cost of infrastructure deployment in the Island's geography and topography, a challenging economic situation, and significantly lower per capita income than any U.S. mainland state, including the lowest state of Mississippi.

For these reasons, Puerto Rico is particularly deserving of a new high-cost support mechanism that provides significant incentives to further network build-out, which is very expensive in Puerto Rico, similar to the specific high-cost funding mechanisms for other rural and high-cost areas, tribal lands and Alaska.

12. What was the impact of the hurricanes on broadcast radio and television services? Did broadcasters face any unique challenges in the face of any of the four hurricanes? To what extent did broadcast-specific best practices exist prior to the

hurricanes? Were they implemented? If so, did they prove effective?

See prior answers.

Sincerely,

/s/ Sandra E. Torres López

Sandra E. Torres López, Esq.
Chairwoman PRTRB

cc: Hon. Ricardo Roselló Nevárez, Governor of Puerto Rico
Associate Members of PRTRB