

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of
Amendments to Part 4 of the Commission's Rules
Concerning Disruptions to Communications
New Part 4 of the Commission's Rules Concerning
Disruptions to Communications
The Proposed Extension of Part 4 of the
Commission's Rules Regarding Outage Reporting
to Interconnected Voice Over Internet Protocol
Service Providers and Broadband Internet Service
Providers
PS Docket No. 15-80
ET Docket No. 04-35
PS Docket No. 11-82

REPORT AND ORDER, FURTHER NOTICE OF PROPOSED RULEMAKING, AND ORDER
ON RECONSIDERATION

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statements.

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I. INTRODUCTION

1. For over a decade, communications providers have kept the Federal Communications Commission (Commission) abreast of major communications disruptions in their networks. These outage

reports, governed by part 4 of our rules¹ and submitted through our web-based, Network Outage Reporting System (NORS), have aided the Commission in accomplishing one of its foundational aims: the protection of life and property through robust, functioning, reliable, resilient, and secure communications networks. Data gleaned from these reports have allowed us to detect adverse outage trends, monitor and assist carriers' service restoration in times of crisis, communicate with affected third parties (e.g., public safety officials, other regulators) and, post-restoration, facilitate discussions and efforts that lead to industry-wide network improvements and standard-setting. The reports also provide an integral role in the discharge of our statutory responsibilities to ensure reliable 911 service to all Americans.

2. Since part 4's outage reporting rules were established,² communications technology and infrastructure have rapidly changed. Indeed, the past ten years have seen as much evolution in communications technology as perhaps any previous decade in U.S. history, both with respect to the nature and pace of the changes seen. These changes are transforming communications networks generally, and in particular are driving 911 service to a much more data-rich "NG911" capability. It stands to reason, then, that rules designed to ensure protection of life and property across the United States – and other critical national security and economic security aims – through the assurance of resilient and reliable communications networks must similarly evolve.

3. We take such action now. In the Report and Order, we take specific steps to improve our current part 4 rules by adopting various proposals made in a Notice of Proposed Rulemaking (*Notice*) adopted in 2015.³ These specific amendments stem from our experience with outage reporting over the past twelve years, and will enhance the information we receive on outages relating to legacy communications networks. In the Further Notice of Proposed Rulemaking, we seek comment on whether and how to update our part 4 outage reporting requirements to address more comprehensively the increasingly essential element in our nation's communications networks: broadband. We also seek comment on other aspects of the part 4 rules that should be reformed or streamlined in light of developments since their adoption. In doing so, we seek to ensure that the Commission's outage reporting system keeps pace with technological change and the impact of evolving consumer preferences. By taking these actions, the Commission will be better equipped to continue promoting "the safety of life and property through the use of wire and radio communication" well into the future.⁴

II. EXECUTIVE SUMMARY

4. In the Report and Order, we adopt the following changes to our part 4 outage reporting rules:

- update the reporting metric and threshold for communication disruptions impacting major transport facilities from a DS3-based to an OC3-based standard, and reduce the reporting window for simplex events (transmission line disruptions) from five days to four days;
- update the reporting of wireless outages by adopting a standardized method to calculate the number of users "potentially affected" in an outage, and clarify that, when an outage affects only some 911 calling centers, or public safety answering points (PSAPs), served by a mobile switching center, wireless providers may utilize their own identifiable scheme to allocate the

¹ See 47 CFR pt. 4.

² Although current Part 4 was established in 2004, outage reporting's roots go back to the early 1990s under then Part 63, see *Amendment of Part 63 of the Commission's Rules to Provide for Notification by Common Carriers of Service Disruptions*, Report and Order, 7 FCC Rcd 2010 (1992).

³ *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications; New Part 4 of the Commission's Rules Concerning Disruptions to Communications*, Notice of Proposed Rulemaking, Second Report and Order, and Order on Reconsideration, 30 FCC Rcd 3206 (2015) (*Notice*).

⁴ 47 U.S.C. § 151.

- number of potentially affected users so long as the allocation reflects the relative size of the affected PSAP(s);
- find that a “loss of communications” to a PSAP occurs when there is a network malfunction or higher-level issue that significantly degrades or prevents 911 calls from being completed to PSAPs, including when 80 percent or more of a provider’s trunks serving a PSAP become disabled;
 - update the rules regarding reporting of outages affecting “special offices and facilities” by (i) extending the reporting obligation to high-level enrollees in the Telecommunications Service Priority program, (ii) eliminating outdated and non-applicable rules, (iii) narrowing the types of airports that are considered “special offices and facilities,” and (iv) limiting outage reporting from airports to critical communications only; and
 - conclude that direct access to NORS by our state and federal partners is in the public interest, but determine that further consideration is warranted to ensure that the process includes adequate safeguards to maintain the security and confidentiality of sensitive information, and accordingly direct the Public Safety and Homeland Security Bureau (Bureau) to study these issues and develop recommendations for the successful implementation of our information-sharing proposals.
5. In the Further Notice of Proposed Rulemaking (Further Notice), we seek comment on:
- a proposal to update part 4 to address broadband network disruptions, including packet-based disruptions based on network performance degradation;
 - proposed changes to the rules governing interconnected Voice over Internet Protocol (VoIP) outage reporting to (i) include disruptions based on network performance degradation, (ii) update our outage definition to address incidents involving specified network components; and (iii) modify the VoIP outage reporting process to make it consistent with other services;
 - reporting of call failures in the radio access network and local access network, and on geography-based reporting of wireless outages in rural areas;
 - refining the covered critical communications at airports subject to part 4 reporting;

6. The Order on Reconsideration limits outage reporting for events affecting airports to outages that impact airport critical communications, and exempts satellite and terrestrial wireless carriers from reporting outages affecting all “special offices and facilities,” extending the exemption previously limited to airports.

III. BACKGROUND

7. The Communications Act of 1934, as amended (the Act), charges the Commission with promoting “the safety of life and property through the use of wire and radio communication.”⁵ Consequently, public safety is one of the “enduring values” that has always guided the Commission’s policymaking.⁶ This core mission underlies our efforts to promote resilient, reliable and secure communications across the nation. Networks have evolved and expanded significantly since the Commission’s establishment, and the Commission has adapted its rules accordingly to continue to exercise its fundamental duties effectively. Our outage reporting rules provide an example of this evolving dynamic.

8. Codified in part 4 of our rules, outage reporting requirements support our public safety goals by directing providers to report network outages that exceed specified magnitude and duration

⁵ 47 U.S.C. § 151.

⁶ See *Technology Transitions, et al.*, GN Docket No. 13-5 *et al.*, Order *et al.*, 29 FCC Rcd 1433, 1441, para. 23 (*Technology Transitions Order*).

thresholds.⁷ Outage data give the Commission an overall picture of communications network reliability that enables it to identify adverse trends. In turn, the data enable Commission staff, working closely with providers and industry working groups, to understand and address systemic vulnerabilities. Such collaborative efforts have led to measurable improvements in network reliability and resiliency,⁸ and to the formulation of policies to promote more reliable and secure communications. Moreover, outage reports, particularly in the early stages of a communications disruption, provide critical situational awareness that enables the Commission to be an effective participant in emergency response and service restoration efforts.

9. The Commission first implemented a communications-disruption reporting scheme for wireline carriers in 1992 in the wake of “several widespread telephone service outages during the [previous] two years.”⁹ The requirements adopted then provided “a systematic means by which to monitor major telephone service outages throughout the nation.”¹⁰ Twelve years later, the Commission established part 4, which articulated a consistent set of reporting obligations, and was intended to extend that regime beyond “the traditional wireline common carrier context” to include wireless, cable, and satellite providers.¹¹ This extension of part 4 enhanced the Commission’s oversight of the “newly emerging forms of communication” upon which the nation had become “vitally dependent.”¹² The new rules were intended to cover a wide range of “communications providers,” including those “affiliated and non-affiliated entities that maintain or provide communications networks or services used by the provider in offering telephony.”¹³ However, the Commission determined at that time not to include “public data networks,” which it defined to “include[e] dial-up telephone, wireless, and cable modem access to the internet.”¹⁴

10. In this Report and Order, we adopt measures to refine the focus of part 4 with respect to wireline and wireless outage reporting to reflect advancements since the Commission last adopted rules in part 4 in 2012. Additionally, in the Further Notice of Proposed Rulemaking below, we examine a newer set of services – broadband services – on which Americans are equally, if not more dependent, and explore how outage reporting can be most effectively applied to broadband services.

⁷ See 47 CFR pt. 4. Reports are filed electronically and with a presumption of confidentiality in the Commission’s NORS database. Each report must describe the nature and cause(s) of the outage, time and date of occurrence, affected geographic area, and other “pertinent information.” 47 CFR § 4.11.

⁸ Impact of the June 2012 Derecho on Communications Networks and Services, Report and Recommendations (PSHSB 2013), <http://www.fcc.gov/document/derecho-report-and-recommendations> (*Derecho Report*).

⁹ *Amendment of Part 63 of the Commission’s Rules to Provide for Notification by Common Carriers of Service Disruptions*, Report and Order, 7 FCC Rcd 2010, para. 5 (1992).

¹⁰ *Id.*

¹¹ See *New Part 4 of the Commission’s Rules Concerning Disruptions to Communications*, Report and Order and Further Notice of Proposed Rulemaking, 19 FCC Rcd 16830, para. 1 (2004) (*2004 Part 4 Order*).

¹² *Id.* at 16840, para. 17.

¹³ *Id.* at 16922. See 47 C.F.R. §§ 4.3.

¹⁴ *New Part 4 of the Commission’s Rules Concerning Disruptions to Communications*, Notice of Proposed Rule Making, 19 FCC Rcd 3373, para. 2 & n.4 (2004) (*2004 Part 4 NPRM*); *2004 Part 4 Order*, 19 FCC Rcd 16830, para. 1 & n.2.

IV. REPORT AND ORDER

A. Major Transport Facility Outages

1. Major Transport Facility Outage Metric and Threshold

a. Background

11. In 2004, the Commission required outage reporting for communication disruptions impacting major transport facilities, specifically those with significant traffic-carrying capacity, such as DS3 circuits.¹⁵ The Commission created a metric and threshold for this outage reporting in standards defined in impacts to DS3 circuits; specifically, the Commission adopted DS3 as the base metric and 1,350 DS3 minutes as the reporting threshold.¹⁶ Since then, our part 4 rules require a covered provider to file reports with the Commission in the NORS online database when a DS3 circuit (or its equivalent) that it owns, operates, leases, or otherwise utilizes,¹⁷ experiences a communication disruption that lasts for at least 30 minutes and meets the 1,350 DS3 minute threshold.¹⁸ When the Commission originally adopted the part 4 rules, DS3 circuits were the “common denominator,” that is, the standard facility used in networks for major traffic transport.¹⁹ Today, however, providers use larger, fiber facilities for major traffic transport, and thus have decreased their use of DS3 circuits.²⁰ This shift has rendered the DS3-based reporting metric and the corresponding 1,350 DS3 minute threshold obsolete and unhelpful for outage analysis. This is borne out by the past ten years’ NORS data, which show a marked increase in reported DS3 standard-based incidents that involve only minor disruptions that are unlikely to have any significant communications impact or jeopardize public safety.²¹ In the same period, the industry has broadly adopted OC3 as the predominate architecture for major transport facilities.

12. Accordingly, in the *Notice*, we proposed to change the base major transport facility outage reporting metric from DS3 to OC3,²² to preserve our near-and medium-term ability to obtain critical information to analyze communications network reliability.²³ We also proposed a corresponding reporting threshold shift from DS3 minutes to OC3 minutes. Finally, we proposed language to ensure inclusion of other transport facilities beyond OC3, i.e., “other circuits or aggregations of circuits that provide equal or greater capacity.”²⁴ To effectuate that technologically neutral objective,²⁵ we proposed

¹⁵ 47 CFR § 4.7(d); *2004 Part 4 Order*, 19 FCC Rcd at 16895-96, 16898, paras. 128, 132; *Notice*, 30 FCC Rcd at 3212-13, para. 19.

¹⁶ 47 CFR § 4.7(d); *2004 Part 4 Order*, 19 FCC Rcd at 16895-96, 16898, paras. 128, 132. In the face of a communication disruption, networks employing circuits with a higher capacity than the DS3-level circuit convert the traffic carrying capacity impact into DS3 minutes. As explained in the *2004 Part 4 Report and Order*, if a single DS3 circuit was out of service for 1,350 minutes, or, two DS3 circuits were out of service for 675 minutes, both events would constitute reportable outages. *2004 Part 4 Order*, 19 FCC Rcd at 16898, para. 132.

¹⁷ 47 CFR § 4.9.

¹⁸ See 47 CFR § 4.7(d) (defining DS3 minutes); see also 47 CFR §§ 4.5; 4.9; 4.11 (outage definitions and reporting requirements).

¹⁹ *2004 Part 4 Order*, 19 FCC Rcd at 16895-96 paras. 128; *Notice*, 30 FCC Rcd at 3212-13, para. 19.

²⁰ COMPTTEL Comments at 1-2; Verizon Comments at 10 (stating “evolution of wireline networks toward higher-capacity facilities and services”); Comcast Comments at 5; ITTA Reply at 3.

²¹ *Notice*, 30 FCC Rcd at 3213, para. 19.

²² *Notice*, 30 FCC Rcd at 3213, para. 20. An OC3 circuit is a much larger facility than a DS3 circuit. A single DS3 circuit may carry up to 45Mbps (megabits per second) of traffic, using coaxial cable or a fiber optic cable. An OC3 circuit, on the other hand, can handle over three times as much traffic as a DS3 (up to 156Mbps).

²³ *Notice*, 30 FCC Rcd at 3213, para. 21.

²⁴ *Id.*

to adjust the number of OC3 minutes based on some measure of equivalency to the current 900,000 user-minute threshold for voice-grade users,²⁶ which we posited as 667 OC3 minutes.²⁷ Despite suggestions to move our metric to OC12 or higher, we find that OC3 gives us the right amount of visibility into customer access circuits that may not be captured by a metric above OC3.

b. Comments

13. The record reflects strong support for adjusting the major transport facility outage metric and threshold as we proposed in the *Notice*. Several commenters agree that major transport traffic now takes place more on fiber than on DS3 circuits.²⁸ Many commenters also acknowledge that changing the standard as proposed will give the Commission information on significant outages that are more likely to have a material impact on users.²⁹ Indeed, commenters predict that the change from DS3 to OC (whether at OC3 or above) will enhance outage reporting efficiency³⁰ and reduce reporting burdens³¹ while also ensuring that the rules continue to target high-capacity facilities³² and track major outage events that have a material impact on users.³³ Commenters also agree that changing the standard from a DS3 basis to a higher capacity level basis will reduce the number of outage reports required for relatively minor incidents.³⁴

14. Despite broad support that the major transport facility outage reporting metric should change from a DS3 to a higher capacity, those supporting the change do not agree on what that specific capacity level should be. Several commenters share our view that the new metric should be based on OC3³⁵—where the threshold would be 667 OC3 minutes.³⁶ ATIS agrees with the proposed shift to an

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²⁵ *Proposed Extension of Part 4 of the Commission's Rules Regarding Outage Reporting to Interconnected Voice Over Internet Protocol Service Providers and Broadband Internet Service Providers*, Report and Order, 27 FCC Rcd 2650, 2656, 2677 paras. 9, 65 (2012) (*2012 Part 4 Order*) (explaining technological neutrality); *2004 Part 4 Order*, 19 FCC Rcd at 16860-61, para. 54.

²⁶ *2004 Part 4 Order*, 19 FCC Rcd at 16895, para. 128.

²⁷ *Notice*, 30 FCC Rcd at 3214, para. 22, notes 32-33. Each DS3 can support up to 667 voice grade users. To retain the equivalency with our voice-based 900,000 user minute threshold, we divided 900,000 by 667, which resulted in 1350 DS3 minute. This means that a DS3 circuit experiencing an outage is reportable when the circuit is down for at least 1,350 DS3 minutes. In the VoIP environment, a DS3 can support 450 VoIP users; thus, to retain our voice-based threshold equivalence, we divide 900,000 by 450, resulting in 2,000 DS3 minutes. With the change in the base metric, from DS3 to OC3, and given that an OC3 circuit is equivalent to 3 DS3 circuits, we divide 2,000 DS3 minutes by 3, which results in the new 667 OC3 minutes threshold. For example, a single OC3 circuit would need to be down for over eleven hours to meet the reporting threshold.

²⁸ COMPTTEL Comments at 1-2; Verizon Comments at 10; ITTA Reply at 3; Comcast Comments at 5.

²⁹ CenturyLink Comments at 9-10; CenturyLink Reply at 3-4; Sprint Comments at 6.

³⁰ CenturyLink Comments at 9-10; XO Communications Comments at 4.

³¹ COMPTTEL Comments at 2; Verizon Comments at ii, 10 (stating “reduce service providers’ . . . administrative burdens”); XO Communications Comments at 4; CenturyLink Comments at 9-10.

³² Verizon Comments at 10; ITTA Reply at 3-4.

³³ CenturyLink Comments at 9-10; XO Communications Comments at 4.

³⁴ COMPTTEL Comments at 2; CenturyLink Comments at 3-4; Verizon Comments at 10; Sprint Comments at 6; XO Communications Comments at 4.

³⁵ COMPTTEL Comments at 1-2; CenturyLink Comments at 3-4; CenturyLink Reply at 1-2; XO Communications Comments at 4-5. Some commenters support a shift to an OC3-based metric, but only for a limited time. See Comcast Comments at 5-6 (cautioning that OC3, and any standard based on it, may become obsolete after only a few years).

³⁶ ATIS Comments at 7.

OC3-based metric, but argues that a single DS3 is equivalent to 28, not 450 voice-grade users.³⁷ ATIS did not provide any rationale for its disagreement with the Commission's position that a single DS3 is equivalent to 450 voice-grade users.³⁸ Others, however, propose alternative metrics and thresholds. For example, some commenters suggest OC12 (or similarly high capacity level) as the appropriate standard because, in their view, it more properly reflects the past decade's network technology advancements than OC3.³⁹ Others, like CenturyLink, push for an even higher metric, e.g., OC48 or OC192, arguing that OC3s are "not generally used for interoffice services, and therefore, are not truly 'major transport facilit[ies]' with 'significant traffic-carrying capacity.'"⁴⁰

15. AT&T, on the other hand, recommends an OC12-based metric, and further proposes to measure the transport facility's "working" capacity, as opposed to our current measure of "failed" capacity, as the appropriate standard for reporting.⁴¹ In support of its working capacity proposal, AT&T explains that OC3 circuits are usually on its network edge (e.g., enterprise local loop and access services), and thus it argues that an OC3 metric would provide little insight on outages affecting the core of the network.⁴² Ultimately, AT&T proposes the elimination of major transport facility outage reporting altogether, and advocates instead that the Commission focus on events that impact customer service, such as "end office isolations, SS7 isolations, call blockages, and E911 failures."⁴³ AT&T further argues that major transport facility outage reports would be "duplicative," because "[OC3] facilit[ies] [are] predominantly used for access circuits" and therefore, OC3-level outages will be "captured" by our existing 900,000 user minute metric used for other reporting requirements.⁴⁴ AT&T maintains that in proposing a new metric and threshold, we miss an opportunity to conduct a comprehensive review of the

³⁷ ATIS Comments at 7.

³⁸ Notice, 30 FCC Rcd at 3213-14, para. 22. We estimate that 450 voice-grade equivalent users can be carried per DS3 in the current VoIP environment. See generally, Randy Conrod, *The Convergence of Networking and Broadcasting* at 780 Figure 4 (1995). A single DS3 has a bandwidth of 44.736 Mbps. See generally, *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, Tenth Broadband Progress Notice of Inquiry, 29 FCC Rcd 9747, 9754, Table 2 (the Commission estimates that one user making a single VoIP call requires 0.100 Mbps (or 100 Kbps) of bandwidth). Thus, if a DS3 is ~45 Mbps (44.736 Mbps) and if we divide 45 Mbps / 0.100 Mbps, that comes out to 450 VoIP users per DS3 (450 ≈ 44.736/.100).

³⁹ ITTA Reply at 3 (an OC12-based metric takes into account the "continued evolution of communications networks"). See also CenturyLink Comments at 9; CenturyLink Reply at 1-4 (suggesting an even higher standard and threshold, OC48); NCTA Reply at 3. Verizon supported the Commission's proposal to adjust the metric from the DS3-based to an OC3-based; however, in reply comments Verizon states that a "higher OC12 level threshold would be more reflective of modern networks—and would help keep the rule relevant longer." Verizon Comments at ii, 2, 10; Verizon Reply at 3.

⁴⁰ CenturyLink Reply at 3-4 (footnotes omitted).

⁴¹ Underlying AT&T's working capacity proposal is its view that when a circuit is affected but no voice grade users are impacted, there should be nothing to report. This proposal appears to be unnecessary, though, as our current rules only require events to be reported when they potentially impact voice-grade users for 1,350 DS3 minutes. Events of lesser impact to voice-grade users are not reportable outages. See also ITTA Reply at 4-5 (discussing AT&T proposal); NCTA Reply at 3 (discussing AT&T's alternative proposal). As later discussed, AT&T ultimately maintains that independent outage reporting requirements for major transport facilities should be eliminated. See AT&T Comments at 10-12.

⁴² Letter from Jamie M. Tan, Federal Regulatory Director, AT&T, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 15-80, ET Docket No. 04-35, at 1 (filed Aug. 26, 2015) (AT&T *Ex Parte*).

⁴³ AT&T Comments at 3-4, 10-12.

⁴⁴ *Id.* at 12.

information that will “best apprise [the Commission] of the overall health of the nation’s networks,”⁴⁵ and, that failed transport capacity is an inadequate metric because it does not necessarily reveal the effect on customers’ service or provide an accurate portrayal of network health.⁴⁶ In the Further Notice below, we seek to study and propose metrics and thresholds to update the part 4 reporting requirements in the context of an ever increasing IP-based broadband network environment, especially in light of evolving emergency communications and converged services.⁴⁷

16. Comcast proposes to abandon a time-division multiplexing (TDM)-based metric and advocates using a bandwidth-based metric instead.⁴⁸ Citing the steady migration throughout the communications industry from TDM to Internet Protocol (IP), and the fact that data traffic is the “primary driver of increased bandwidth needs for transport services,”⁴⁹ Comcast argues that the Commission should align its metrics accordingly. Instead, Comcast advocates for the adoption of a “bandwidth-based standard, such as 1GB outage that lasts for at least 30 minutes.”⁵⁰ Comcast further suggests that its approach can accommodate future changes more readily than a TDM-based standard.⁵¹ Verizon disagrees, arguing that more study is needed to ensure Comcast’s platform-shift approach would capture a “genuine outage or significant degradation of service,” and “apply on a cross-platform basis.”⁵²

c. Discussion

17. We adopt our proposals to (i) change the metric and threshold for major facility outages from a DS3-based to an OC3-based metric, and (ii) adjust the threshold to 667 OC3 user minutes accordingly. There is substantial record support for moving our metric to a standard based on higher capacity levels (e.g., to OC3 or higher). These changes update our major transport facility reporting to reflect prevalent technological changes in networks, and do so in a logical and technologically neutral manner. Compliance with this revised metric shall begin no later than 6 months after the Effective Date of the rules.

18. Moreover, multiple commenters agree that providers have been moving a majority of their traffic onto larger fiber facilities, a trend that is likely to continue.⁵³ Thus, although a DS3-based metric may have been the right standard for 2004’s predominant technology for major transport, it is no longer appropriate.⁵⁴ At this time, adjusting the metric to OC3 will streamline the reporting in general, a

⁴⁵ *Id.* at 11.

⁴⁶ *Id.* at 10-11.

⁴⁷ *See infra*. Section V.B.

⁴⁸ Comcast Comments at 2, 5-7; Letter from Mary McManus, Executive Director, Regulatory Affairs, Comcast, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 15-80, ET Docket No. 04-35, at 1 (filed Aug. 28, 2015) (Comcast *Ex Parte*).

⁴⁹ Comcast Comments at 5-6; Comcast *Ex Parte* at 1.

⁵⁰ Comcast suggests that, although in the short term, “OC3 circuits or other circuits or aggregations of circuits that provide equal or greater capacity”, coupled with the increased reporting threshold to 667 OC3 minutes, may “prove to be reasonable adjustments,” however, are “likely to become obsolete after only a few years.” *See* Comcast Comments at 6.

⁵¹ Comcast Comments at 6-7 (explaining that voice traffic’s shrinking portion of total bandwidth renders a voice-based standard or its equivalence obsolete).

⁵² Verizon Reply at 3.

⁵³ COMPTTEL Comments at 1-2; Verizon Comments at 10 (stating “the evolution of wireline networks today toward higher-capacity facilities and services”); ITTA Reply at 3; Comcast Comments at 5 (stating “ever-increasing bandwidth requirements for major transport facilities have shifted such traffic from TDM-based DS3 to higher-capacity IP-based circuits”).

⁵⁴ 2004 *Part 4 Order* at 16895, para. 128.

benefit both to providers and the Commission alike through reduced reporting of minor incidents, allowing time and resources for an increased focus on meaningful outage reporting that is more likely to have a user material impact.⁵⁵

19. At this time, we are not persuaded by those commenters who advocate for a higher OC level.⁵⁶ An OC3-based metric will generate the visibility into the network components that an OC12-based metric may not, as it would capture access circuit outages for business customers. Setting a metric at OC12 would provide the Commission with limited, inadequate visibility into major transport facility infrastructure and related outages, i.e., those beyond the network core.⁵⁷ Further, we recognize that some networks may utilize OC3 circuits as access circuits and others may utilize them for interoffice facility traffic, and so an OC3-based metric may not provide the same degree of visibility into operational health for all providers' networks.⁵⁸ Nevertheless, we believe that basing our outage reporting requirements at the OC3 level "or their equivalents" as proposed in the *Notice* captures the important communication disruptions in networks large and small, regardless of providers' OC3 circuit usage.⁵⁹ Moreover, an OC3 metric allows the Commission to better focus on outage trends that may uniquely affect small and medium-sized businesses, whose traffic is often transported over OC3 facilities. Therefore, we adopt an OC3 metric for major facility outages.⁶⁰

20. In doing so, we affirm the importance of an independent outage reporting requirement for major transport facility failures. Through the collected information on the "potential impact on all communications services of major infrastructure failures," specifically information about "infrastructure components having significant traffic-carrying capacity,"⁶¹ as the part 4 rules were intended to capture, our work has led to increased collaborative efforts with providers and a more efficient mitigation of outage trends. AT&T's proposal to eliminate major transport facility reporting requirements assumes that (1) our 900,000 user-minute threshold captures the same visibility of major transport facilities as our current DS3 metric and threshold, and that (2) providers only use OC3 circuits as access circuits to conclude that the adoption of our proposal would lead to duplicative reporting.⁶² While a few communication disruptions may be reportable outages because they meet both thresholds (900,000 user

⁵⁵ Sprint Comments at 6; XO Communications Comments at 4-5; COMPTTEL Comments at 1-2.

⁵⁶ A few commenters suggest an OC12 metric or higher. See NCTA Reply Comments at 3; CenturyLink Reply Comments at 3-4 (footnotes omitted); AT&T Comments at 3, 11-12 (in conjunction with a working capacity threshold); ITTA Reply at 4-5 (supporting AT&T working capacity threshold of OC12); Verizon Comments at 10; Verizon Reply at 3. For the discussion of possible future adjustments, refer to the Further Notice. See Section V.B.4 *infra*.

⁵⁷ In 2004, the Commission observed that a DS3 was a communications highway put in place to carry traffic, in digital format, ranging from simple alarm and control circuits to voice circuits, radio and television programs, ATM or credit card transaction-carrying circuits, FAA flight control circuits, Department of Defense circuits, Federal Reserve Bank circuits involving multi-billion dollar transfers, and to circuits critical to the operation of the stock and bond markets. We will remain vigilant in ensuring visibility into the availability of such "significant portions of the communications highway." *2004 Part 4 Order* 19 FCC Rcd at 16836, para. 8.

⁵⁸ AT&T Comments at 12.

⁵⁹ *Notice*, 30 FCC Rcd at 3213, para. 21 (stating the proposal as "based on impact on OC3 circuits or *other circuits or aggregations of circuits that provide equal or greater capacity*") (emphasis added); *Notice*, 30 FCC Rcd at 3236 Appendix C, Proposed Rules ("OC3 circuits or their equivalents"). For example, an OC48 is a larger facility than an OC3, however, in the event of an outage, the service affected on an OC48 can be converted into our OC3-based metric, and thus be reported to the Commission using OC3-based unit of measurement.

⁶⁰ See Appendix B, Final Rules.

⁶¹ *2004 Part 4 Order* 19 FCC Rcd at 16895-96, 16899, paras.127-28, 135-36 (discussing goals and intent for major transport facility outages and the DS3 metric).

⁶² AT&T Comments at 3-4, 11-12.

minutes; 1,350 DS3 minutes), by having the two metrics and thresholds we capture outages caused by switch failures or major transport equipment failures. Therefore, if we eliminated the major transport outage reporting, we would likely miss communication disruptions experienced in interoffice transport facilities. Moreover, while some providers, such as AT&T, may use OC3 circuits as access circuits, other providers may design their networks differently and some customers, like small and medium-sized businesses may be uniquely impacted at the OC3 level. To address networks designed like AT&T's, the rules adopted today capture communication disruptions experienced in higher capacity levels than OC3, by defining OC3 minutes using OC3 "or their equivalents."

21. The adoption of the OC3 metric ensures an appropriate level of Commission visibility into the resiliency and reliability of critical infrastructure presently—and for at least the near-to-medium term—in use in communications networks for major traffic transport. Such visibility, adjusted to the OC3 level, is an essential component of the Commission's network reliability and public safety duties. Thus, we decline proposals to eliminate major transport facility outage reporting.⁶³

22. Finally, two commenters suggest alternative proposals, neither of which provides the needed visibility into the nation's networks for the Commission to ensure communications are reliable and resilient.⁶⁴ AT&T's "working capacity" proposal would use a measure such as "the percentage of the circuit dedicated to voice channels."⁶⁵ It would thus require providers to assess whether and when to give the Commission the major transport facility outage reports it needs. Our current requirements give clear direction: once a DS3 circuit experiences a communication disruption for at least 1,350 DS3 minutes and lasts for at least 30 minutes, the provider must report the outage accordingly.⁶⁶ As announced in 2004, we continue to believe that "our concern is the failure of working DS3s regardless of the services being carried or the fill at the time of the failure."⁶⁷ Significantly, AT&T's "working capacity" proposal would generate burdens on providers by imposing measurement mechanisms based on a working capacity metric that, as an initial step, would require the provider to identify the percentage of the circuit dedicated to voice channels.⁶⁸ It remains unclear whether other providers can measure working capacity on their facilities at this time, or the costs involved with such monitoring. It is also unclear how AT&T's proposal applies in the legacy or the transition network contexts. Further, AT&T's proposal would constitute a shift that does not comport with the logic of outage reporting, which necessarily focuses on what does not work, instead of what does work. Accordingly, we reject AT&T's "working capacity" proposal.

23. Comcast proposes a bandwidth-based standard for major transport facility outages, as described above.⁶⁹ The proposal requires further study and therefore cannot be the basis to change our metric and threshold for major transport facility outage reporting at this time. We agree with Comcast that data traffic makes up an increasingly large part of bandwidth needs for transport services. We also note that we are in a state of transition from TDM to IP. This state of transition requires reporting requirements that are sufficient to capture outages in both TDM and IP networks, including specifically those outages impacting physical facilities and network components (e.g., copper and fiber cables,

⁶³ Comcast Comments at 2, 5-7; AT&T Comments at 3-4, 11-12.

⁶⁴ AT&T Comments at 3-4, 11-12; AT&T Reply at 3; AT&T *Ex Parte*; Comcast Comments at 2, 5-7; Comcast *Ex Parte*.

⁶⁵ AT&T *Ex Parte* at 1.

⁶⁶ 47 CFR § 4.7(d) (defining DS3 minutes); *see also* 47 CFR §§ 4.5; 4.9; 4.11 (outage definitions and reporting requirements).

⁶⁷ 2004 *Part 4 Order* 19 FCC Rcd at 16901-02, para. 143.

⁶⁸ For over ten years, our requirements have built in voice-based user impacting metrics by aligning our 1,350 DS3 minutes for major transport facility outage reporting to our 900,000 user-minutes metric. *Notice*, 30 FCC Rcd at 3213-14, para. 22. Providers are not required to report events on DS3 circuits carrying only data.

⁶⁹ *See* Comcast Comments at 5-6; Comcast *Ex Parte* at 1; *but see* Verizon Reply at 3.

networking switches and routers). We also believe that the successful and reliable delivery of IP-based services and applications (e.g., email) is important. The OC3 metric and 667 OC3 minute threshold adopted today address outages in major transport facilities carried through TDM-based and SONET facilities. We nevertheless find that Comcast's proposal has merit and seek further input on broadband reporting thresholds in the Further Notice below.⁷⁰ Therefore, we decline to adopt Comcast's proposal for a bandwidth-based standard for reporting at this time.

2. Simplex Outage Reporting

a. Background

24. Under our current rules, providers must file reports for simplex event outages lasting five days or more.⁷¹ A simplex event occurs when a DS3 circuit, designed with multiple paths to provide circuit resiliency, experiences a failure on one working path.⁷² In the *Notice*, we proposed to shorten the reporting window for simplex events to 48 hours.⁷³ As we explained, in recent years the Commission has noticed an uptick in simplex outage reports, which suggests that our expectations that providers would implement best practices for resolving such events when we established the five-day reporting window were not met.⁷⁴ Thus, in the *Notice*, we concluded that our proposed 48-hour window would ensure that providers properly prioritize service maintenance and restoration in the event of simplex outages.⁷⁵

b. Comments

25. Most commenters oppose our proposal to reduce the reporting window from five days to 48 hours. Several commenters argue that factors such as weather, other hazardous conditions, or the complexity of repair tasks could render a 48-hour target unattainable in many cases.⁷⁶ Indeed, COMPTTEL argues that bad weather may make a "simplex repair . . . completed within 60 hours . . . 'expeditious' under the circumstances," and a shorter reporting window cannot "speed up" repairs that "hazardous conditions prevent."⁷⁷ Other commenters claim that a 48-hour window would unnecessarily increase reporting burdens as well as compliance costs without corresponding benefits.⁷⁸ Some

⁷⁰ See *infra*. Section V.B.

⁷¹ 47 CFR §§ 4.7(d) and 4.9. See *2004 Part 4 Order*, 19 FCC Rcd at 16898-99, para. 134; *2004 Order Granting Partial Stay*, 19 FCC Rcd 25039, 25040-41, para. 3; *Notice*, 30 FCC Rcd at 3214-15, paras. 24-25. Initially, we required that outages lasting for 30 minutes or more and meeting the required 1,350 DS3 minutes—including those involving DS3 circuits designed with a built-in path—be reported to the Commission. *2004 Part 4 Order*, 19 FCC Rcd at 16898-99, para. 134. However, the Commission, on its own motion, granted a partial stay of this requirement for a limited type of event—DS3 circuits with built-in paths where one of those paths is not available, termed "simplex events"—up to the extent these outages were not "restored to full service within five days of their discovery." *2004 Order Granting Partial Stay*, 19 FCC Rcd at 25040-41, para. 3. See *Notice*, 30 FCC Rcd at 3215, paras. 26-27, notes 41-45.

⁷² *2004 Order Granting Partial Stay*, 19 FCC Rcd at 25039-40, paras. 1-2.

⁷³ *Notice*, 30 FCC Rcd at 3215-16, paras. 28-30.

⁷⁴ *Notice*, 30 FCC Rcd at 3215-16, para. 28.

⁷⁵ *Notice*, 30 FCC Rcd at 3216, para. 29.

⁷⁶ See generally AT&T Comments at 4, 12-15; AT&T Reply at 4-5; ATIS Comments at iii, 7-8; CenturyLink Comments at 2, 6-8; CenturyLink Reply at 6-7; COMPTTEL Comments at 3-4; Verizon Comments at ii-iii, 10; Sprint Comments at 6; XO Communications Comments at 5-6; NCTA Reply at 5; Intrado Reply at 33-34; ITTA Reply Comments at 2, 9-10; NTCA Reply at 5.

⁷⁷ COMPTTEL Comments at 4.

⁷⁸ XO Communications Comments 6; COMPTTEL Comments at 3; ITTA Reply at 10; Sprint Comments at 6. Some commenters disagree with our estimates that our proposal will result in an overall reduction of reports. See AT&T Comments at 14-15 (takes 12 hours to prepare and file a report, not 2 hours as stated . . . costs "clearly outweigh any

(continued....)

commenters maintain that, rather than tighten the window, the Commission should eliminate outage reporting for simplex events entirely.⁷⁹ CenturyLink, for example, argues that simplex events do not directly impact consumers and, thus, should not be viewed as “outages” at all.⁸⁰ And, although Verizon supports the status quo, it argues that a three-day threshold would be preferable to a 48-hour threshold.⁸¹ Verizon argues that a three-day threshold would better accommodate service providers’ practices and technician maintenance and work schedules.⁸²

c. Discussion

26. We conclude that simplex outage reporting remains an important part of the situational awareness matrix that NORS provides. The Commission has a responsibility to ensure network reliability and resiliency, including in major transport facilities designed with a built-in path protection. Over the years, we have observed a rise in simplex event outage reports as the rule stands now with the five-day reporting window, which appears to indicate that providers filing these reports are not able to repair the simplex events in a period less than five days.

27. We are persuaded by the record, however, that moving the reporting window from five days to 48 hours may not strike the proper balance between providers’ best practice-driven repair and maintenance capabilities⁸³ and incentives, and the Commission’s situational awareness needs and network reliability-assurance goals through simplex event outage reports. We acknowledge, as some commenters argue, that factors such as weather or hazardous conditions impact service repair.⁸⁴ We cannot, however, ignore that extended simplex events jeopardize service reliability.

28. Accordingly, we adopt a four-day interval for simplex outage reports. Further, compliance with this revised interval shall begin no later than 6 months after OMB approval. In this regard, we reject proposals by some commenters to maintain the current five-day window,⁸⁵ which we

(Continued from previous page) _____
benefit”); NCTA Reply Comments at 4; ATIS Comments at 7; CenturyLink Comments at 6-8; Verizon Comments at 3,10; Verizon Reply at 4; Sprint Comments at 6, 10; NTCA Reply at 6.

⁷⁹ CenturyLink Reply Comments at 7.

⁸⁰ CenturyLink Reply at 7-8; *see also* AT&T Comments at 4, 14 (stating “a simplex event is not an outage at all . . . customers do not experience any disruption in or degradation of service . . . simplex events are not real outages”); COMPTTEL Comments at 2-3; Sprint Comments at 6; XO Communications Comments at 5; NCTA Reply Comments at 2-3; NTCA Reply at 2; Intrado Reply at 33 (citing to AT&T Comments); ITTA Reply Comments at 9; Other commenters, though not calling for outright elimination of simplex reports, still believe the Commission should reduce simplex reporting obligations, not amplify them. *See* ITTA Reply at 10.

⁸¹ Verizon Comments at ii-iii, 10.

⁸² Verizon Comments at ii-iii, 10.

⁸³ Some commenters argue that simplex events are “typically scheduled for repair during regular maintenance windows and are corrected within 24 to 48 hours in the normal course of business,” or work is performed on “in-service equipment during low traffic periods,” and repairs sometimes take longer than five days; additional “factors” “may contribute to longer restoration intervals. *See* COMPTTEL Comments at 3-4; AT&T Comments at 13, 15; AT&T Reply at 4 (citing to ATIS Comments). ATIS Comments at 7-8 (stating that the best practice “does not provide a specific timeline). AT&T cites to general CSRIC best practices unrelated to simplex event repair. AT&T Comments at 15 (citing CSRIC Best Practices 9-8-8087, 9-9-0693, & 9-9-0697).

⁸⁴ XO Communications Comments 5-6 (explaining that providers may be unable to repair an event within that period due to weather or hazardous conditions or complicated repairs that require ordering additional equipment or supplies; repair delays beyond the provider’s control); COMPTTEL Comments at 4 (repairs “are not made within a 48-hour window, [and] it is often because harsh weather or other hazardous conditions preclude effectuating immediate repairs”). *See also* AT&T Initial Comments at 13-14; ATIS Initial Comments at 7-8; XO Communications Initial Comments at 5-6; CenturyLink Reply 6-7; ITTA Reply at 10; NTCA Reply at 5.

⁸⁵ CenturyLink Reply at 7; Intrado Reply at 33-34; NTCA Reply at 4-6; Verizon Reply at 4.

view as inadequate to incent timely repair, and we reject those calls for eliminating simplex reporting altogether.⁸⁶ The Commission has a responsibility to ensure network reliability and resiliency, including in major transport facilities designed with built-in path protection,⁸⁷ and simplex reporting is a needed and helpful tool used to meet this responsibility.

29. Currently, we require that providers report simplex events lasting longer than 5 days; we have not required reports for events repaired within five days.⁸⁸ A provider may experience a short simplex event, conduct necessary repairs within five days and not be obligated to report the event under part 4. We no longer believe that our five-day reporting window for simplex outages is an adequate measurement tool to ensure network reliability and resiliency. The four-day reporting window that we adopt today is designed to alert the Commission to trends that include significant outages, while also accommodating Verizon's suggested need for providing a reasonable amount of time to address the outages before the reporting threshold is met.⁸⁹

B. Wireless Outage Reporting

1. Calculating the Number of Potentially Affected Users in Wireless Outages

a. Background

30. To determine if a wireless network outage is reportable based on meeting the 900,000 user-minute threshold, a wireless service provider must calculate the number of users "potentially affected" by the outage.⁹⁰ Pursuant to sections 4.7(e) and 4.9(e), providers should perform the calculation "by multiplying the simultaneous call capacity of the affected equipment by a concentration ratio of 8."⁹¹ This call capacity measurement is typically undertaken at the mobile switching center (MSC).⁹² As wireless technologies have evolved, however, providers have made different technological and engineering choices, resulting in a variety of methods by which they measure simultaneous call capacity. These developments have led to a lack of methodological consistency among providers in reporting outages. Such inconsistencies compromise the Commission's ability to detect and analyze wireless network outage trends.⁹³

31. Accordingly, to facilitate the receipt of accurate, uniform outage information from wireless providers, we proposed in the *Notice* to adopt a more standardized, technologically neutral method for calculating the number of users "potentially affected" by a wireless network outage.⁹⁴ We sought comment on two possible approaches.⁹⁵ Under the first approach, wireless providers would calculate potentially affected users by multiplying the number of disabled cell sites by the average

⁸⁶ CenturyLink Reply at 7.

⁸⁷ *2004 Part 4 Order*, 19 FCC Rcd at 16898-99, para. 134.

⁸⁸ *2004 Order Granting Partial Stay*, 19 FCC Rcd at 25040-41, para. 3. *See Notice*, 30 FCC Rcd at 3215, paras. 26-27, notes 41-45.

⁸⁹ *2004 Order Granting Partial Stay*, 19 FCC Rcd at 25040-41, para. 3. *See Notice*, 30 FCC Rcd at 3215, paras. 26-27, notes 41-45.

⁹⁰ 47 CFR § 4.9(e)(2).

⁹¹ 47 CFR §§ 4.7(e), 4.9(e).

⁹² When adopting outage reporting rules for wireless services in 2004, the Commission chose this method to avoid "computational difficulties" of directly measuring outages within the more dynamic radiofrequency (RF) portion of the network. *2004 Part 4 Order*, 19 FCC Rcd at 16889, para. 111.

⁹³ *Notice*, 30 FCC Rcd at 3216-17, para. 31.

⁹⁴ *Id.* at 3217, para. 32.

⁹⁵ *Id.* at 3217-18, para. 33.

number of users the provider serves per site.⁹⁶ Under the second approach, providers would use the Visitor Location Register (VLR) to determine the actual number of users that were being served at each affected cell site when the outage commenced.⁹⁷

b. Comments

32. The majority of commenters support our proposal to adopt a more standardized method for wireless providers to calculate the number of users “potentially affected” by an outage.⁹⁸ While ATIS appreciates our goal, it does recommend that wireless providers should be allowed to pick the method they want to use.⁹⁹ CCA opposes the proposal on the basis that it would create two separate metrics, one for PSAP outages and the other for all other outages, which would complicate outage reporting or impose administrative burdens on carriers, particularly smaller carriers with limited staff support.¹⁰⁰

33. The majority of commenters also support adopting the first approach to calculating potentially affected users – multiplying the number of disabled sites by the average number of users per site.¹⁰¹ AT&T states that this revised formula “is simpler than the current measurement and can be implemented across the industry at little to no additional cost.”¹⁰² CTIA asserts that this method has the benefit of being “clear, simple, and not overly burdensome for providers to implement.”¹⁰³ And, although Verizon proposes an alternative method for reporting wireless outages (discussed below), it also supports using average number of users per site over the VLR option.¹⁰⁴

34. Commenters universally oppose the VLR option for determining the number of potentially affected users in a wireless outage. Several commenters assert the use of the VLR makes the calculation more complex, would potentially be costly to implement, and would likely lead to potentially

⁹⁶ *Id.* The average number of users that a wireless provider serves per site is the total number of customers served by the provider divided by the total number of cell sites used by the provider. As we noted in the *Notice*, for purposes of calculating this number, a wireless provider would assume that each user is served by a single site and site assignments are distributed evenly throughout the provider’s network. *Id.*

⁹⁷ *Id.* The VLR holds certain data on subscribers when they roam in the location area of an MSC; this minimizes the number of queries from the MSC to the home location register, where data on subscribers primarily resides. *Id.* at 3217, n.61.

⁹⁸ AT&T Comments at 23; CPUC Comments at 9; CTIA Comments at 3; Verizon Comments at 8. Sprint understands the need for consistency, but asserts that attempting to create a “consistent methodology may present challenges. Sprint Comments at 7.

⁹⁹ ATIS Comments at 8-9.

¹⁰⁰ CCA Comments at 3-4.

¹⁰¹ AT&T Comments at 23; CTIA Comments at 3; Verizon Comments at 8.

¹⁰² AT&T Comments at 23. AT&T adds that this option also has “the virtue of being technolog[ical]y neutral ...[and] also should provide the Commission with a better representation of consumer impact because providers will be basing their reports on their average users per site, not a static aggregation factor of 8 that does not change to accommodate changes in the underlying network.” AT&T Comments at 23.

¹⁰³ CTIA Comments at 3.

¹⁰⁴ Verizon Comments at 8; Verizon Reply at 4-5.

inconsistent reporting.¹⁰⁵ Many commenters also point out that the VLR is being phased out, as wireless technology advances.¹⁰⁶

c. Discussion

35. We believe that a more standardized, technologically neutral method for calculating the number of “potentially affected” users for wireless network outages is critically important to ensure consistency in reporting across providers, regardless of the technological differences in their networks, and that such consistent reporting will enhance our situational awareness through more uniform, accurate, and reliable NORS data. To accomplish these aims, we adopt the first of our proposed approaches: to determine if an outage meets the 900,000 user-minute threshold, a wireless provider must multiply the number of macro cell sites¹⁰⁷ disabled in the outage by the average number of users served per site, which is calculated as the total number of users for the provider divided by the total number of the provider’s macro cell sites.¹⁰⁸ For purposes of this calculation, wireless providers should include only traditional cell tower deployments, i.e., macro cell sites, and not small cell sites (e.g., femto-cells, pico-cells, and micro-cells) or other wireless architecture (e.g., Wi-Fi, Distributed Antenna Systems). Compliance with this revised methodology shall begin no later than nine (9) months after the Effective Date of the rules.

36. We agree with commenters that this approach is simpler than the current measurement and can be implemented at little to no additional cost.¹⁰⁹ This simplicity of measurement and implementation promotes consistent outage reporting that should facilitate accurate analysis of the NORS data we receive. Conversely, as several commenters noted, using data from the VLR (i.e., the second approach) would be costly to implement, less likely to provide consistent data among providers and, in any event, would be less useful over time because the VLR itself is currently being phased out.

37. Given that the method we adopt is relatively straight-forward for carriers to calculate and will result in uniform, consistent reporting, we disagree with ATIS that wireless providers should be allowed to pick the method they want to use.¹¹⁰ Such an approach would lead to inconsistent data among providers, thwarting the very goal of adopting the new metric. Also, given that we believe, and providers tend to agree, that the new method will be easy to implement, we disagree with CCA that implementing a

¹⁰⁵ AT&T Comments at 23-24 (arguing that implementing VLR would require sophisticated and expensive data tools); CTIA Comments at 3 (asserting that VLR would not be consistent with goal of technological neutrality); Sprint Comments at 7 (claiming that VLR does not provide real-time data, only users that may have been in an area within a given timeframe); Verizon Comments at 8 (stating that VLR would “impose significant IT burdens”).

¹⁰⁶ CTIA Comments at 3 (stating that VLR is associated with older technologies and is being phased out); Sprint Comments at 7 (VLR is expected to sunset with CDMA technology and will not be supported with Voice over LTE technology); Verizon Comments at 8 (stating that VLR is not used in LTE or unlicensed wireless networks).

¹⁰⁷ Macro cells are high-powered wireless base stations owned by a wireless carrier intended to provide coverage to a large area of mobile network users (e.g., a county or parish). Macro cells have higher power outputs, typically in the tens of watts, and also have a higher efficiency output in covering large areas. See *Wireless Telecommunications Bureau Seeks Comment on Revising the Historic Preservation Review Process for Small Facility Deployments* in WT Docket No. 15-180, 30 FCC Rcd 8160 (WTB 2015), at 8160 n.4 (Wireless Bureau contrasts “macrocells” – which is a common term that refers to “traditional cell tower deployments” – with “small cells” (i.e., “low-powered wireless base stations that function like cells in a mobile network but provide significantly smaller coverage area than . . . macrocells”), and “DAS networks” (which the Bureau described as “another wireless alternative to macrocells, but differ[ent than] . . . small cells in that, whereas each small-cell deployment includes its own transceiver equipment that generally serves one wireless carrier/operator, a DAS network involves the use of transceiver equipment at a central hub site to support multiple antenna locations throughout the desired coverage area and in ‘neutral-host’ deployments can serve multiple wireless carriers/operators”).

¹⁰⁸ As with our current rule, for an outage to be reportable, it must last for at least 30 minutes.

¹⁰⁹ See, e.g., AT&T Comments at 23; CPUC Comments at 9; CTIA Comments at 3.

¹¹⁰ ATIS Comments at 8-9.

new, uniform method for calculating the number of “potentially affected” users with wireless outages would complicate outage reporting or impose administrative burdens on carriers, particularly smaller carriers with limited staff support.¹¹¹ Although we are sympathetic to CCA’s concern that wireless providers will have to use one calculation for wireless outages generally and another for those affecting PSAPs,¹¹² the scenarios are different and warrant different treatment. One calculation ensures the Commission has situational awareness of network health holistically, while the other provides direct public safety/emergency preparedness awareness through 911-specific outage reporting. We intend to monitor the need to revisit this reporting scheme based on experience, as small cells become capable of covering more capacity.

38. Finally, we note that Verizon and T-Mobile each propose alternatives that depart from using the “user-minutes” standard. Verizon suggests simply notifying the Commission whenever 30 macro cell sites go out in a particular geographic area, such as a Cellular Market Area (CMA) or Partial Economic Area (PEA).¹¹³ We believe the approach we adopt effectively achieves Verizon’s simplicity objectives through per-cell site reporting, maintaining the user-minute reporting standard common across various platforms (wireless, wireline, VoIP, satellite, etc.). Moreover, Verizon’s threshold of 30 cell sites within a CMA or PEA would not cover many—if not most—rural areas. T-Mobile advocates allowing carriers to measure outages “using real-time data where technically feasible,” and when it is not feasible, to use the approach we adopt herein.¹¹⁴ We are concerned that, too often, such data will not be available, which will result in only a few carriers reporting using this data, resulting in the kind of reporting inconsistency we seek to avoid.

2. Estimating the Number of Potentially Affected Wireless Users for Wireless Outages Affecting a PSAP

a. Background

39. Under our rules, wireless service providers must report any outage of at least 30 minutes duration that “potentially affects” a 911 special facility (i.e., PSAP).¹¹⁵ An outage potentially affects a 911 special facility whenever, among other things, there is a loss of communications to a PSAP potentially affecting at least 900,000 user minutes.¹¹⁶ Shortly after the Commission adopted part 4, Sprint asked for clarification of this requirement when a wireless outage affects only some of the subtending PSAPs.¹¹⁷ Specifically, Sprint proposed that wireless providers be able to allocate the users covered by the MSC equally among the number of subtending PSAPs affected by the outage.¹¹⁸

40. Sprint’s proposed method of allocation, however, does not take into account the fact that PSAPs vary greatly in the number of users served. Therefore, in the *Notice* we proposed that wireless providers can allocate capacity when only one subtending PSAP is affected, but if they do, they must do

¹¹¹ CCA Comments at 3-4.

¹¹² *Id.*

¹¹³ Verizon Comments at 8. *See also* AT&T Reply at 9-10 (supporting Verizon alternative). In the *Incentive Auction Report and Order*, the Commission adopted PEAs as the service area for 600 MHz Band licenses. *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6569, para. 71 (2014). *See* 47 CFR § 27.6(l).

¹¹⁴ T-Mobile Reply at 8-9, n. 32.

¹¹⁵ 47 CFR § 4.9(e)(5).

¹¹⁶ 47 CFR § 4.5(e).

¹¹⁷ Sprint 2005 Petition at 3. A PSAP is considered “subtending” when it could be affected by a failure of any particular network equipment, such as an MSC.

¹¹⁸ *Id.*

so in reasonable proportion to the size of the PSAP in terms of number of users served.¹¹⁹ As we stated in the *Notice*, this calculation method is consistent with what we observe to be the current reporting practice of most providers.¹²⁰

b. Comments

41. Several commenters support our proposal to allocate capacity to each subtending PSAP in reasonable proportion to its size in terms of number of users served.¹²¹ CPUC notes that PSAPs vary greatly in size, and prefers the approach proposed in the *Notice* “because it considers the impact from the perspective of the served entity, the PSAP.”¹²² CPUC adds that allocating capacity to subtending PSAPs will “show the particular impact to each PSAP more accurately.”¹²³ On the other hand, Sprint continues to advocate its method of dividing equally by the number of subtending PSAPs, arguing that the Commission’s method adds “increased complexity and is unlikely to produce a more accurate picture of the user minutes impacted by the outage.”¹²⁴ CTIA supports Sprint’s position, arguing that PSAP boundaries often change, so wireless providers do not know exactly the number of users served by each PSAP.¹²⁵ ATIS argues that it may be difficult for wireless carriers to know the number of users that any particular PSAP serves, and suggests that the Commission “take on responsibility for calculating this metric and for sharing the methodology and results with the PSAP community, service providers and other stakeholders.”¹²⁶

c. Discussion

42. We adopt our proposal and allow wireless providers to allocate capacity when an outage only affects some PSAPs served by an MSC, so long as the allocation is done in reasonable proportion to the size of the subtending PSAP(s) in terms of number of users. As noted by CPUC, PSAPs vary greatly in size nationwide, and allocating capacity to subtending PSAPs will limit reporting to those significant outages that potentially impact public safety and for which the rules are intended.¹²⁷ In determining the number of potentially affected users served by a PSAP, providers can use various sources for the data so long as the method they choose provides a reasonable estimate of the relative size of the PSAP and can be occasionally updated.¹²⁸ Reasonable estimates could be based on but are not limited to the following sources: the subtending PSAPs’ relative size determined by using the number of 911 calls sent to the PSAP on a historical basis; the number of 911 calls to each PSAP during the outage (if available in real time); or the population served by each PSAP determined either through subjective data or extrapolated from census or other objective data sources that would be relied upon by a population statistician. Any of these methods should account for the relative size of the PSAP affected by the outage. Compliance with this revised allocation standard shall begin no later than nine (9) months after the Effective Date of this requirement.

¹¹⁹ *Notice*, 30 FCC Rcd at 3219, para. 37.

¹²⁰ *Id.*

¹²¹ APCO Comments at 5; CPUC Comments at 10; Intrado Reply at 11-12.

¹²² CPUC Comments at 10.

¹²³ CPUC Comments at 10.

¹²⁴ Sprint Comments at 9.

¹²⁵ CTIA Comments at 4-5.

¹²⁶ ATIS Comments at 9-10.

¹²⁷ *Notice*, 30 FCC Rcd at 3219, para. 37.

¹²⁸ Commission review of the reports will take into account the flexibility provided to entities.

43. We decline to adopt an across-the-board allocation standard, such as Sprint apparently suggests; however, providers may use the Sprint allocation approach or an alternate method that provides a reasonable estimate of the relative size of the PSAP. Providers must inform the Commission, in writing, of the approach they are using via the first NORS filing in which they are reporting data based on their approach. While Sprint's approach may be simple to calculate, dividing simply by the number of subtending PSAPs would not capture the significance of the outage. Only by allocating capacity based on the size of the PSAP will the estimate reflect an accurate picture of the size of the outage. We recognize, as ATIS and CTIA note, PSAP boundaries can fluctuate and the number of users allocated to the PSAP may change.¹²⁹ Based on our experience dealing with PSAPs on a regular basis, we do not anticipate that these fluctuations will be significant or occur frequently, although the Commission would revisit this issue in the future if necessary.¹³⁰ So long as the method reasonably captures the relative size of PSAPs, the method of allocation will be acceptable and, to the extent that it is needed, providers can work with Commission staff informally for further guidance.

C. Call Failures – Reporting of Outages that Significantly Degrade Communications to PSAPs

1. Background

44. On January 26, 2011, a significant snow and ice storm hit the Washington, D.C. metropolitan area, causing widespread problems for all affected counties and cities in a several hundred mile swath from central Virginia through Baltimore, Maryland.¹³¹ These problems included the failure of roughly 10,000 wireless 911 calls carried over a major wireless provider's network to reach PSAPs in Montgomery and Prince George's Counties, Maryland.¹³² The provider did not report these outages, nor the problem(s) that caused them, to either the Commission or to affected PSAPs.¹³³

¹²⁹ ATIS Comments at 9-10; CTIA Comments at 4-5.

¹³⁰ For example, new PSAPs may be opened, or more likely, PSAPs may be consolidated. However, we do not believe that consolidation will happen at such a pace that the rule adopted herein would be rendered obsolete. We also believe that state and local governments will seek to avoid PSAP closure wherever possible.

¹³¹ See National Weather Service, *January 26, 2011 Snowfall Report*, (Jan. 26, 2011), <http://www.weather.gov/1wx/20110126snow> (“ . . . [c]onditions deteriorated rapidly as heavy precipitation overspread the region at the start of the late afternoon rush hour. Colder air moved into the area during this time, allowing precipitation to change quickly to sleet and then heavy snow. There were many reports of thunder and lightning occurring with the sleet and snow. Heavy snow continued through the evening hours with snowfall rates around 2 to 3 inches per hour during the height of the event. . . . The snowfall coinciding with the afternoon and evening rush hour commute led to hours and hours of gridlocked traffic from treacherous driving conditions. There were countless reports of commuters needed 5 to 10 hours to get home from work while others abandoned their vehicles. The heavy, wet snow brought down many trees and powerlines. The Washington Post reported almost 400,000 people lost power in the D.C. area that evening.”); Washington Times, *Snowstorm leaves D.C. area feeling powerless*, (Jan. 27, 2011), <http://www.washingtontimes.com/news/2011/jan/27/snowstorm-leaves-dc-area-feeling-powerless/?page=all>.

¹³² The Montgomery County PSAP handles all 911 calls placed in Montgomery County, home to over one million citizens and nearly 115,000 businesses. Similarly, the Prince George's County PSAP serves close to one million citizens and roughly 73,000 businesses. See John Kinsley, Montgomery County, Maryland, Fire & Rescue, *Emergency Communications Center*, <http://www.montgomerycountymd.gov/mcfrs/about/ecc.html> (last visited May 25, 2016); Prince George's County, *911 Emergency Communications*, <http://www.princegeorgescountymd.gov/sites/911/Services/Pages/default.aspx> (last visited Apr. 8, 2016); United States Census Bureau, *Quick Facts, Montgomery County, Maryland*, <http://quickfacts.census.gov/qfd/states/24/24031.html> (last visited May 25, 2016).

¹³³ Though more pronounced in the context of the storm, these outages were not first-time events; to the contrary, similar outages had occurred on other occasions in 2010. See Letter from Rear Adm. Jamie Barnett (ret.), Chief,

(continued....)

45. Inquiry into the outages revealed the root cause: cascading, “wink” failures of the Centralized Automatic Message Accounting (CAMA) trunks¹³⁴ used in the provider’s 911 network architecture.¹³⁵ CAMA trunk arrangements are commonly used in legacy wireline network architecture for 911 call delivery, so the “wink” failures during the January 2011 storm are not specific to the provider’s network trunk arrangements.

46. In the *Notice*, the Commission noted its belief that “such a narrow reading of [section 4.5(e)(1)] is not consistent with the intent of the Part 4 outage reporting process.”¹³⁶ In response, the Commission proposed in the *Notice* to codify in part 4 how to address this situation, and asked commenters to discuss specific rules proposed toward that end. Specifically, we sought comment on whether to amend section 4.5(e)(1) to specify when “degradation of communications to a PSAP constitutes a reportable outage” under part 4.¹³⁷ By doing so, we rejected the notion that PSAP-related outages need only be reported “when a PSAP is rendered unable to receive *any* 911 calls for a long enough period to meet the reporting threshold.”¹³⁸ We proposed revising Section 4.5(e)(1) to provide that “any network malfunction or higher-level issue that significantly degrades or prevents 911 calls from being completed constitutes a ‘loss of communications to PSAP(s),’ regardless of whether the PSAP is rendered completely unable to receive 911 calls.”¹³⁹

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Public Safety and Homeland Security, FCC, to Kathleen Grillo, Senior Vice President, Public Affairs, Policy and Communications, Verizon Communications, DA 11-328 (Feb. 17, 2011).

¹³⁴ CAMA trunks connect a 911 network’s selective routers (routers used specifically to handle emergency call traffic) to PSAPs, transmit a 911 caller’s automatic numbering information (ANI) to the PSAPs using special multi-frequency digits based upon CAMA-specific signaling standards. The trunks, originally designed to transmit calling party (originating) numbers between a carrier’s end office and a toll office, are widely deployed within 9-1-1 wireline communications networks, as well as in non-911 network architecture. *See* ATIS Standard on NRSC 9-1-1 CAMA Trunk Throughput Optimization Analysis (Nov. 2011), <https://www.atis.org/docstore/product.aspx?id=25661>.

¹³⁵ “Wink” failures occur when a selective router attempts to deliver a 911 call to a PSAP over an idle trunk, but the hand-off protocol between the router and the PSAP (the “wink”) ultimately fails. More specifically, this means that the PSAP’s customer premises equipment (CPE) fails to communicate to the selective router that it is “off-hook”, i.e., open and able to receive ANI and ALI information associated with the 911 call. This can occur when the CPE fails to recognize quickly enough that a 911 caller has disconnected – i.e., that an “on-hook” condition has become an “off-hook” one – and, thus, that that a new 911 call can be received (“seized”). The result is a miscommunication that that particular trunk is unavailable to receive a call from the 911 selective router (a “no-wink” failure), which then pushes the call to the next best available trunk. If a call is re-presented to the original trunk that had the no-wink failure (as is common in heavy call volume periods) and the same problem occurs (a “double wink” failure), the 911 selective router will stop attempting to deliver calls via that trunk. If a heavy call volume event persists, the problem can cascade to all trunks serving a PSAP, leading to reduced, or total loss of, call-handling capacity within the trunk groups serving a particular PSAP. *See id.* at 2.

¹³⁶ *Notice*, 30 FCC Rcd at 3209, para. 9 (stating that providers may mistakenly read the provision to “require reporting only when there is a complete [outage], i.e., when a PSAP is rendered unable to receive *any* 911 calls for a long enough period to meet the reporting threshold.”).

¹³⁷ *Notice*, 30 FCC Rcd at 3209, para. 9.

¹³⁸ *Id.* (emphasis in original).

¹³⁹ *Notice*, 30 FCC Rcd at 3210, para. 12. *See also* 47 CFR §§ 4.5(a). Section 4.5(a) defines an outage as a “significant degradation in the ability of an end user to establish and maintain a channel of communications as a result of failure or degradation in the performance of a communications provider’s network.” With respect to “a 911 special facility” – e.g., a PSAP – an “outage” (as defined in 4.5(a)) occurs when four elements are simultaneously present: (i) there is a “loss of communications to PSAP(s) potentially affecting at least 900,000 user minutes” that (ii) lasts for at least 30 minutes, and (iii) the failure does not occur at, or on the premises of, the PSAP and, finally, (iv) re-routing for *all* end users was not available during the loss). Such outages, as defined by section 4.5, must be reported to the Commission.

2. Comments

47. Many public safety, state, and carrier commenters agree that the Commission should specify the circumstances under which a “loss of communications” to PSAPs rises to the level of “significant degradation” such that it would be reportable under part 4.¹⁴⁰ APCO advises that “knowledge of a significant degradation of service short of a complete failure is of high value to PSAPs and emergency managers,” a sentiment echoed by NASNA, which believes that “it should not matter” whether a PSAP has suffered a complete or only a partial loss of ability to receive 911 calls.¹⁴¹ NYPSC goes even further and submits that a provider’s duty to report an outage should arise “whenever a service disruption or significant degradation prevents completion of any 911 call at the PSAP for any period of time, for any customer.”¹⁴²

48. Comcast, CenturyLink and XO Communications do not oppose such an approach, so long as the Commission (i) does not require reporting when re-routing is available for all calls to PSAPs,¹⁴³ (ii) requires reporting only when an outage that meets the 30 minute/900,000 user minutes threshold “actually” impacts emergency call handling or completion,¹⁴⁴ and (iii) gives providers sufficient lead time to make the necessary adjustments to ensure compliance (e.g., through properly configuring alarms on trunks, etc.).¹⁴⁵

49. On the other hand, wireless providers are largely opposed to the proposal to include “loss of communications” to PSAPs under section 4.5(e). CTIA argues that the Commission’s concern is “speculative,” and its proposals “unworkable.”¹⁴⁶ Sprint opposes the proposed rules on the grounds that “CMRS providers do not have visibility into PSAP facilities on the PSAP side of the point of demarcation, so CMRS providers would not be able to report on whether a PSAP is experiencing an issue that significantly degrades or prevents 9-1-1 calls from being completed.”¹⁴⁷ Verizon notes the same difficulties,¹⁴⁸ and submits that the “solution is to ensure that service providers apply the existing rule correctly, not impose new reporting burdens.”¹⁴⁹ Several providers maintain that part 4 reports should only be required where a PSAP is completely unable to receive 911 calls.¹⁵⁰

¹⁴⁰ APCO Comments at 3; NASNA Comments at 1; CPUC Comments at 8; NYPSC Comments at 4; CenturyLink *Ex Parte* Letter, August 21, 2015, at 1. *See also* XO Comments at 2 (“XO does not oppose the Commission amending § 4.5(e)(1) to require reporting of a partial loss of communications, provided it retains the exemption from reporting where rerouting is available for all end users calling to a PSAP.”); Comcast Comments at 2-3.

¹⁴¹ APCO Comments at 3; NASNA Comments at 1. *See also* CPUC Comments at 8.

¹⁴² NYPSC Comments at 4.

¹⁴³ XO Comments at 2; Comcast Comments at 2-3.

¹⁴⁴ Comcast Comments at 2-3.

¹⁴⁵ CenturyLink *Ex Parte* Letter at 1.

¹⁴⁶ CTIA Comments at 8.

¹⁴⁷ Sprint Comments at 3 (adding that “CMRS providers do not have real-time call path information associated with PSAP operations. In addition, CMRS providers do not have a methodology that would inform them of partial outage events. While CMRS providers may be alerted of an outage on their networks through their own network monitoring tools or from their vendors, CMRS providers do not have monitoring tools that would signal an issue associated with other networks or PSAP operations.”).

¹⁴⁸ Verizon Comments at 4.

¹⁴⁹ Verizon Comments at 2. Verizon contends that the Commission “need only reiterate its current policy that a significant degradation of 911 service (like a complete outage) is reportable based on when the provider reasonably becomes aware pursuant to normal business practices that a reportable outage has occurred.” *Id.* at 2-3.

¹⁵⁰ ATIS Comments at 5; AT&T’s Comments at 18; CTIA Comments at 8; Sprint Comments at 3.

3. Discussion

50. Part 4's purpose is to collect information on "service disruptions that could affect homeland security, public health or safety."¹⁵¹ To meet this goal, the rules must include the kinds of 911 call-impacting trunk failures at issue in the January 2011 D.C. area storm. Indeed, subsequent work done by the Commission (and, eventually, by industry vis-à-vis ATIS) to identify, study and develop solutions to the CAMA trunk failures is a model of what could—and should—have happened under part 4: a "systematic analysis of the conditions that le[d] to [significant communications] degradations [that] help[ed] reveal potential solutions."¹⁵² The ability to analyze, develop solutions, and work with providers to implement those solutions enhances public safety.

51. With respect to 911-related outages, our rules are quantitative and qualitative in scope and application, and define reportable outages both in terms of total connectivity failure and qualitative failures.¹⁵³ Consistent with that approach, we adopt the proposal in the *Notice* to specify that a "loss of communications" should trigger part 4 reporting obligations in the same way as a "network malfunction or higher-level issue that significantly degrades or prevents 911 calls from being completed to PSAPs." We provide that a "loss of communications" occurs when at least 80 percent of a 911 service provider's trunks serving a PSAP (i.e., trunks over which the 911 service provider has control) become impaired to the point that they cannot support 911 call delivery in accordance with the Commission's rules, including the information typically delivered with 911 calls.¹⁵⁴ In other words, a 911 service provider would not need to report when 80 percent of its trunks go down if the remaining 20 percent could support delivery of 911 calls, including the number and location information, but it must report if not all 911 traffic can be re-routed, or if the re-routed traffic cannot be delivered without stripping it of number or location information. We disagree with Comcast that the Commission must further define "impairment" of a 911 call for service providers to comply with the reporting rules.¹⁵⁵ Moreover, this approach maintains the thrust of the rule as currently written: if sufficient re-routing is available for all affected 911 calls and no necessary information is stripped from those calls, then providers are not required to report to the Commission, irrespective of the percentage of available trunk capacity.

52. We find this to be a clear, objective metric about which 911 service providers would "become reasonably aware pursuant to normal business practices,"¹⁵⁶ such as the installation and monitoring of trunk alarms.¹⁵⁷ We acknowledge Sprint and Verizon's comments about needing visibility into trunks to know when a "loss in communications" occurs, but we note that this rule applies to 911

¹⁵¹ *Notice*, 30 FCC Rcd at 3210, para. 11 (internal quote citation omitted).

¹⁵² *Id.*

¹⁵³ For example, a qualitative failure could be when a call is stripped of automatic number or location data or other features that should be delivered with the call as sent by the end user. 47 CFR § 4.5(e)(1)-(4) (defining "outage that potentially affects a 911 special facility" as a "loss of communications . . . or . . . a loss of 911 call processing capabilities . . . or . . . [isolation of] one or more E-911 tandems/selective routers . . . or . . . loss of ANI/ALI . . . and/or a failure of location determination equipment")

¹⁵⁴ See 47 CFR § 20.18(i) (requiring CMRS providers to provide location information on 911 callers to PSAPs); 20.18(j) (requiring CMRS providers to deliver confidence and uncertainty data where requested by a PSAP).

¹⁵⁵ Comcast Comments at 2-3.

¹⁵⁶ Verizon Comments at 3.

¹⁵⁷ We do not intend to list, define, or otherwise impose particular compliance solutions for providers, consistent with the Commission's long-standing practice of deferring to network service providers in the design and engineering of their networks. Trunk alarms are already ubiquitous as a network reliability "best practice," and would presumably enable providers to determine when the 80 percent threshold is approaching or is reached in a given event. See ATIS Standard on NRSC 9-1-1 CAMA Trunk Throughput Optimization Analysis, at p. 8 ("There are several existing Industry Best Practices that support the use of strong alarming to identify 9-1-1 conditions that have the potential to reduce the throughput of 9-1-1 calls to the PSAP").

service providers, which, by definition, do have visibility into such trunks. We also believe that this metric strikes a fair balance between proposals from the public safety community who believe the bar should be set as low as possible and include even non-critical outages,¹⁵⁸ and 911 service providers who want only to report in instances of complete 911 call failure across all trunks (which would not include the January 2011 incident described above).¹⁵⁹

53. We also agree with CenturyLink that an 80 percent threshold will not be overly burdensome so long as providers are given the lead time necessary to manage the costs of solution development and implementation needed for their particular networks.¹⁶⁰ To allow time for compliance with other 911-related Commission requirements, CenturyLink initially proposed a one-year implementation deadline for this requirement.¹⁶¹ We recognize that some providers will be able to move faster and achieve compliance well before one year, given present or scheduled investments in necessary facilities, but others will need more time to comply with the requirements. Further, we note that providers have had ample time to comply with the requirements underlying CenturyLink's concern, but we nevertheless feel a one-year implementation timeframe is appropriate to allow flexibility for smaller carriers. Thus, because it does not interfere with other part 4 reporting requirements, we find that a one-year implementation timeframe should be sufficient for both small and large providers to achieve compliance, and incorporate that timeframe into our rules. Accordingly, compliance with this revised metric shall begin no later than one year after OMB approval.

54. Finally, we disagree with CTIA's argument that our concerns are "speculative": the 10,000 911 call failures associated with the January 2011 D.C. area storm had a significant real world impact but was nevertheless deemed non-reportable by a licensee. Nor do we believe our proposals are "unworkable": 911 service providers should reasonably be expected to have adequate visibility into PSAP trunk failure.¹⁶²

¹⁵⁸ APCO Comments at 3 (proposing a 50% threshold); NASNA Comments at 1 (. . . "it should not matter whether a PSAP has suffered a complete loss of ability to receive 911 calls or only a partial loss. It is still an outage that negatively impacts public safety"); NYPSC Comments at 4 (. . . whenever a service disruption or significant degradation prevents completion of any 911 call at the PSAP for any period of time, for any customer", the carrier should file under Part 4).

¹⁵⁹ Verizon Comments at 2-3; AT&T Comments at 18.

¹⁶⁰ CenturyLink Ex Parte at 1; NTCA Reply at 2.

¹⁶¹ CenturyLink Ex Parte at 1 ("Due to other 911-related activities such as the upcoming reliability certifications required under Section 12 of the Commission's Rules, CenturyLink proposes that reporting on an 80% partial loss threshold not become effective until at least October 15, 2016 or later.").

¹⁶² Our intent here is to address the obligations of entities with direct links (i.e., trunks) to PSAPs, otherwise known as 911 service providers, to report to the Commission. We recognize the concerns raised by some commenters about the collateral effect of modifying the definition of "loss of communications" in this context. *See, e.g.*, CenturyLink Comments at 10-11. The obligations adopted here are independent of other rules requiring covered 911 service providers to report the existence of an outage to PSAPs, and we do not apply the definition of "loss of communications" discussed herein to section 4.9(h) at this time. To the extent the *Notice* raised additional questions about 911 call completion that involve other segments or elements of 911 call origination and delivery to providers with those links, those questions are deferred for consideration in other proceedings currently open. *See, e.g.*, *911 Governance and Accountability; Improving 911 Reliability*, Policy Statement and Notice of Proposed Rulemaking, 29 FCC Rcd 14208, 14217, para. 20 (2014) (*911 Governance Notice*).

D. Special Offices and Facilities

1. Identifying Special Offices and Facilities

a. Background

55. A major underlying goal of outage reporting generally, and for reporting on “special offices and facilities” in particular, is for the Federal government – including Federal government users - to have situational awareness of events that impact homeland security and the nation’s economic well-being. When the Commission adopted part 4’s special office and facilities rules in 2004, the Commission deferred to the National Communications System (NCS)¹⁶³ to determine which facilities would be considered major military installations or key government facilities,¹⁶⁴ and would, under certain conditions, report “mission-affecting outages” to the NCS.¹⁶⁵ The NCS would in turn forward reports of those outages to the Commission.¹⁶⁶ However, the NCS was dissolved in 2012.¹⁶⁷ Accordingly, in the *Notice*, the Commission sought comment on how it should thereafter identify “special offices and facilities” for purposes of part 4.¹⁶⁸

56. We note that reporting requirements applicable to “special offices and facilities” have been an integral part of part 4 since the rules’ adoption in 2004.¹⁶⁹ The Commission defined “special offices and facilities” as major military installations, key nuclear power plants, and certain larger airports.¹⁷⁰ As it relates to covered airports, the rules stated that all outages lasting 30 minutes or longer that “potentially affect communications” must be reported, and that “mission-affecting outages” to certain government facilities and military installations (as determined by NCS) also were covered by part 4.¹⁷¹

57. We proposed to classify as “special offices and facilities” those facilities enrolled in or eligible for the Telecommunications Service Priority (TSP) Program, which prioritizes the restoration and provisioning of circuits used by entities with National Security/Emergency Preparedness (NS/EP) responsibilities and duties. We invited views on whether this initial proposal was too expansive, and how the proposal could best be modified to satisfy our public safety goals, specifically, whether any new rule should apply only to facilities enrolled in the TSP program, and further, whether facilities only at the

¹⁶³ The NCS was a consortium of federal agencies charged with managing the nation’s emergency communications. *See* Exec. Order No. 12,472, 49 Fed. Reg. 13,471 (Apr. 3, 1984), *amended by* Exec. Order No. 13,286, 68 Fed. Reg. 10,619 (Feb. 28, 2003) and Exec. Order No. 13,407, 71 Fed. Reg. 36,975 (June 26, 2006). The NCS was disbanded in 2012.

¹⁶⁴ *2004 Part 4 Order*, 19 FCC Rcd at 16923 (“[NCS member agencies] will determine which or their locations are ‘major military installations’ and ‘key government facilities.’”). *See also* 47 CFR § 4.5(b).

¹⁶⁵ *2004 Part 4 Order*, 19 FCC Rcd at 16928-29 (“[w]hen there is a mission-affecting outage [lasting or expected to last more than 30 minutes], the NCS . . . will either” (1) forward a report of the outage to the Commission [with relatively detailed information]; (2) forward a report to the Commission [with relatively oblique information]; or (3) hold the report at the NCS due to the critical nature of the application.”).

¹⁶⁶ *Id.*

¹⁶⁷ Executive Order 13618 (July 6, 2012), <https://www.whitehouse.gov/the-press-office/2012/07/06/executive-order-assignment-national-security-and-emergency-preparedness->. The executive order also established the National Security and Emergency Preparedness Communications Executive Committee as a successor forum to NCS for discussion of national security and emergency preparedness issues. *See id.* at Section 3.1.

¹⁶⁸ *Notice*, 30 FCC Rcd at 3220, para. 38.

¹⁶⁹ *2004 Part 4 Order*, 19 FCC Rcd at 16866-67, paras 64-66.

¹⁷⁰ 47 CFR § 4.5(b); the Commission gave the member agencies of the National Communications System (NCS) the authority to determine which of their locations were “major military installations” and “key government facilities.” *Id.*

¹⁷¹ 47 CFR § 4.5(c).

highest priority levels be included.¹⁷² We also asked whether there were alternative classification frameworks that would be more suitable, including broadening the scope of the definition of “special offices and facilities” to include those facilities that are guaranteed priority restoration under “TSP-like” provisions in service-level agreements.¹⁷³ We concluded by requesting comment on our assumption that redefining the term “special offices and facilities” to include some variant of TSP-enrolled and/or – eligible facilities would not have an appreciable cost impact.¹⁷⁴

b. Comments

58. Comments on our “special offices and facilities” classification proposal range from a call to eliminate reporting all together, to multiple alternatives for identifying the subject facilities. AT&T, for example, states that

[i]t is unnecessary for the Commission to rush to fill any perceived void in its outage reporting rules by requiring providers to file special reports for outages [of facilities] enrolled in or eligible for [the TSP program]. The Commission’s current rule demonstrates that a ‘special offices and facilities’ outage reporting rule has little to no practical utility and eliminating these rules simply cannot have any effect on the Commission’s ability to obtain information about critical outages *because the current special offices and facilities rules were never implemented by the NCS and its member agencies during the twenty years the rules were in effect.*¹⁷⁵

59. APCO offers strong support for the *Notice*’s proposal that the Commission amend its rules applicable to “special offices and facilities” to all enrolled and enrollment-eligible TSP program participants. APCO conditions its support for the proposal, however, on all PSAPs and other appropriate public safety agencies being eligible for the TSP program.¹⁷⁶ CompTel and XO, also support our proposal, but urge that only enrolled TSP participants be covered,¹⁷⁷ with XO adding that customers must provide a certification of enrollment in the TSP program to providers.¹⁷⁸

60. Most commenters who oppose the special facilities reporting proposal (to include all TSP enrollees and eligible participants) feel that it would subject too many entities to the rules, without a corresponding increase in public safety or situational awareness; would needlessly divert a provider’s resources to tracking down and tagging circuits; and would require providers to identify tens of thousands of new, potentially TSP-eligible parties.¹⁷⁹ In addition to questioning whether rules for “special offices and facilities” are even needed, AT&T notes that the TSP program was not intended to isolate failures for purposes of reporting these outages into NORS, but rather to prioritize restoration and provisioning of circuits used by entities with NS/EP responsibilities and duties.¹⁸⁰ CenturyLink opposes the more expansive rule, noting that the number of facilities eligible for TSP enrollment in its footprint at any level

¹⁷² *Notice*, 30 FCC Rcd at 3220, para. 40.

¹⁷³ *Id.*

¹⁷⁴ *Id.*

¹⁷⁵ AT&T Comments at 19 (footnotes omitted, emphasis added). *See also* ITTA Reply at 13; Intrado Reply at 27.

¹⁷⁶ APCO Comments at 5.

¹⁷⁷ CompTel Comments at 5; XO Comments at 6.

¹⁷⁸ XO Comments at 6.

¹⁷⁹ *See, e.g.*, AT&T Reply Comments at 21 Sprint Comments at 9; CompTel Comments at 6; XO Comments at 7; Verizon Comments at 11; Comcast Comments at 8; *See also* ITTA Reply Comments at 12; Reply Comments of NTCA – The Rural Broadband Association at 9 (filed July 31, 2015) (NTCA Reply Comments); Sprint Comments at 9.

¹⁸⁰ AT&T Comments at 21.

reaches the tens of thousands, and that it would be a “significant effort” to tag all of those facilities, as well as integrating them (from a network and alarming perspective) so they could be properly tracked for NORS reporting purposes.¹⁸¹ Comcast notes that including all TSP-enrolled facilities would increase the number of facilities covered by the thousands, and that providers cannot reliably ascertain which entities may be program-eligible. Further, Comcast argues that despite the *Notice*’s assertion that adopting the proposal would not “have an appreciable cost impact,” requiring providers to develop complicated new tracking systems to try to identify such entities would impose significant costs,¹⁸² while CCA argues that expansive proposal would result in an increase of the number of outage reports required to be submitted by reporting providers, with little or no corresponding public interest benefit.¹⁸³

61. Many commenters express support for our proposal so long as the Commission limits applicability of the rules to entities that are (1) enrolled in the TSP program, and (2) only those designated at the highest TSP priority levels (i.e., Levels 1 and 2).¹⁸⁴ In its comments, Comcast suggests that the Commission include, in any new or amended rule, only those TSP participants that constitute “major military installations” or “key government facilities” as “special offices and facilities:”

For the most part, such entities will be those enrolled in TSP priority Level 1 or Level 2. Extending the definition to all entities that are enrolled in the TSP program, irrespective of priority level, would flood the Commission with reports related to outages that do not actually impact a “special office or facility.” Although such offices and facilities unquestionably are important and should be part of the TSP program, reporting outages that affect such facilities, rather than “major military installations” or “key government facilities,” risks obfuscating truly critical outages.¹⁸⁵

62. Other commenters concur with Comcast. CenturyLink, for example, argues that if the Commission is going to use the TSP framework to define special facilities, it should limit the scope to TSP Level 1 and 2 entities enrolled in the program. Although there are other levels of TSP eligibility, CenturyLink believes expanding “special offices and facilities” beyond Levels 1 and 2 – which are the most critical – would create burdens for carriers with diminishing public safety benefits.¹⁸⁶ Similarly, NCTA also argues that if the Commission decides to use the TSP regime as a basis for defining special offices and facilities, it should limit the definition only to entities enrolled at the Level 1 or Level 2 priority.¹⁸⁷

c. Discussion

63. As a preliminary matter, we reject comments suggesting the “special offices and facilities” reporting rule itself is outdated and ought to be eliminated altogether. Under the rules that have been in place since 2004, neither the NCS nor its member agencies appear to have followed the applicable portions of sections 4.5 (on self-identification as a “special office or facility”) and 4.13 (on member agencies reporting qualifying outages to the NCS, and NCS using its discretion to forward those outage

¹⁸¹ CenturyLink Reply Comments at 9-10 (filed July 31, 2015).

¹⁸² Comcast Comments at 8.

¹⁸³ CCA Comments at 4.

¹⁸⁴ 47 CFR Part 64 app. A § 12(c).

¹⁸⁵ Comcast Comments at 7.

¹⁸⁶ CenturyLink Reply Comments at 10.

¹⁸⁷ National Cable & Telecommunications Association Reply Comments at 2-3 (filed July 31, 2015). *See also* Verizon Reply at 7 (“[a]t most, the commission should limit any TSP-based reporting threshold to *actual*, not merely “eligible,” TSP Priority Levels 1 and 2 facilities and users – and then only for high capacity facilities – to mitigate the substantial monitoring and other IT-related costs.” (Footnote omitted, emphasis in original)).

reports to the Commission),¹⁸⁸ so that previous “special offices and facilities” formula did not work as the Commission intended. We do not believe, however, that this fact in and of itself signifies that reporting outages at special offices and facilities is not useful. Rather, we should fix the rule, not eliminate it, to facilitate its original goals. Reporting on “special offices and facilities” (as amended) is an important component in our efforts to promote public safety.

64. Today, we characterize “special offices and facilities” as those enrolled in Levels 1 or 2 of the TSP program. To close the significant reporting gap on special offices and facilities, we proposed initially to classify all facilities enrolled in, or eligible for, the TSP program as “special offices and facilities” for part 4 reporting purposes.¹⁸⁹ As we observed in the *Notice*, the TSP program prioritizes the restoration and provisioning of circuits used by entities with NS/EP responsibilities and duties. The TSP framework for restoring critical circuits comprises five priority levels, with Levels 1 and 2 reserved for critical national security and military communications and the remaining levels dedicated to the protection of public safety and health and the continued functioning of the economy.¹⁹⁰ As the Bureau previously has noted, “[v]ery few circuits receive a TSP priority Level 1 or Level 2 assignment.”¹⁹¹ Compliance with this requirement shall begin no later than eighteen (18) months after OMB approval.

65. We believe that outages affecting highest-priority TSP enrollees (i.e., Levels 1 and 2) are the types of outages for which we must have situational awareness; the communication security of TSP enrollees affects our nation’s security leadership and posture, its public safety and public health, and our national economic system, and the Commission must be aware of any trends, through NORS analysis, that relate to certain TPS enrollees. As commenters note, were we to adopt a formula to cover all entities that were either enrolled or eligible to be enrolled in the TSP program, the number of reportable events would overwhelm both the covered parties and available Commission resources, with no concomitant increase in public safety or national security. Even to include parties that are enrolled at all priority levels in the program would have posed significant challenges. Thus, we believe limiting coverage to only Levels 1 and 2 strikes an appropriate balance between the untenable position of eliminating any rules applicable to “special offices and facilities,” and extending the rules to all entities that are enrolled or eligible to be enrolled in the TSP program at any of the five priority levels, which we concede could incur a significant cost for a minimal benefit. We find that limiting our rule to Levels 1 and 2 will not present widespread technical, administrative, or financial burdens to covered parties.

2. Section 4.13

66. Section 4.13 directs special offices and facilities to report outages to the now-dissolved NCS, which could then forward the reported information to the Commission at its discretion.¹⁹² Because our rules separately impose requirements on communications providers to report outages that potentially

¹⁸⁸ *Notice*, 30 FCC Red at 3219-20 paras. 38, 41 (“[n]o such reports were ever forwarded to the FCC from the NCS prior to the latter’s dissolution in 2012.”)

¹⁸⁹ *Id.* at 3219-20, para. 39; *see also* 47 CFR Part 64 app. A § 12(c). TSP-enrolled facilities include military installations; federal cabinet-level department and agency headquarters; state governors’ offices; Federal Reserve Banks; national stock exchanges; federal, state, and local law enforcement facilities; hospitals; airports; major passenger rail terminals; nuclear power plants; oil refineries; and water treatment plants.

¹⁹⁰ There are five priority levels in the TSP program, with Levels 1 and 2 reserved for National Security leadership and certain military communications lines. *See* <http://www.dhs.gov/tsp-eligibility> (Level 1 serves national security leadership, and Level 2 supports the national security posture and U.S. population attack warning systems) (last accessed Aug. 18, 2015).

¹⁹¹ *See* FCC, Telecommunications Service Priority (TSP), <https://transition.fcc.gov/pshs/emergency/telecom.html> (emphasis added) (last visited May 25, 2015).

¹⁹² 47 CFR § 4.13.

affect “special offices and facilities,” and in light of the elimination of the NCS,¹⁹³ we proposed deleting section 4.13 “as redundant with respect to information that providers are already required to supply, and obsolete with respect to obligations regarding the NCS.”¹⁹⁴

67. We agree with commenters that we should remove section 4.13 from our rules as redundant of other provisions within part 4, and accordingly will delete it.¹⁹⁵ While supporting elimination of section 4.13, AT&T added that we should incorporate elsewhere in the rules a requirement that “affected facilities” initiate contact with the communications provider about the disruption in service.¹⁹⁶ We decline to adopt AT&T’s proposal, finding it would unnecessarily preclude alternative methods that providers may use to receive information about outages without corresponding benefit.

3. Airport Reporting Requirements

a. Background

68. Airports included in the Federal Aviation Administration’s (FAA) National Plan of Integrated Airports Systems (NPIAS) are designated as falling into one of four categories: primary commercial service (PR), non-primary commercial service (CM), reliever (RL), and general aviation (GA). Currently, airports designated as PR, CM, and RL are defined as “special offices and facilities” for purposes of section 4.5(b) of the Commission’s rules,¹⁹⁷ and so are subject to outage reporting requirements set forth in sections 4.11 and 4.13 of the Commission’s rules¹⁹⁸ that do not apply to outages affecting other kinds of facilities.

69. In the *Notice*, we proposed two significant changes to our reporting requirements for outages that affect airport communications. First, we proposed amending section 4.5(b)’s definition of the types of airports considered as “special offices and facilities,” to narrow its focus to airports designated as PR.¹⁹⁹ Second, we proposed to clarify that reportable outages are those that impact “critical communications” at those airports.²⁰⁰ This latter proposal is based in large part on Sprint’s petition that the Commission clarify that not *all* communications affecting an airport need be reported, but rather only critical communications that affect the safety and mission of certain airports.²⁰¹ We discuss Sprint’s Petition in the *Order on Reconsideration* section of this document.

¹⁹³ Exec. Order No. 13,618, 77 Fed. Reg. 40,779 (Jul. 11, 2012) (revoking Exec. Order 12,472 (Apr. 3, 1984), which had established the NCS).

¹⁹⁴ *Notice*, 30 FCC Rcd at 3220, para. 41.

¹⁹⁵ See CompTel Comments at 7 (footnote omitted); ITTA Reply Comments at 12-13 (“The Commission adopted [Section 4.13] with the expectation that [NCS] would identify “major military installations” and “key government facilities” that would qualify as special offices and facilities which in turn would be required to self-identify to carriers “mission-critical” outages that should be reported to the Commission . . . [B]efore the NCS was eliminated in 2012, none of its member agencies ever identified which of their facilities should be deemed major military installations or key government facilities. Nor, in the twenty years since the rule was adopted, did the NCS ever forward any outage reports to the Commission.”) (footnotes omitted); ATIS Comments at 10.

¹⁹⁶ AT&T Comments at 20-21.

¹⁹⁷ 47 CFR § 4.5(b).

¹⁹⁸ 47 CFR §§ 4.11, 4.13.

¹⁹⁹ *Notice*, 30 FCC Rcd at 3221, para. 43.

²⁰⁰ *Notice*, 30 FCC Rcd at 3220-21, para. 42.

²⁰¹ *Petition of Sprint Corporation* at 4-5 (filed Jan. 3, 2005) (Sprint Petition) (in adopting the new Part 4 rules in the 2004 Part 4 Order, “[t]he Commission did not mention, let alone justify, doing away with the Section 63.100(a)(6) limitation that carriers report only outages affecting the critical communications facilities serving airports. . . . Sprint urges the Commission to clarify that it had no intention of removing the Section 63.100(a)(6) language from Part 4 that limits reporting of airport outages to disruptions in communications being carried over critical

(continued....)

70. Regarding narrowing the scope of airports to only those designated “PR,” we noted that most reports concerned outages not significant enough to pose a substantial threat to public safety, particularly at smaller regional airports, and thus we sought comment on amending the definition of “special offices and facilities” to exclude all airports other than those designated “primary commercial service” airports (i.e., the nation’s most heavily trafficked airports, where even minor degradations in critical communications can pose grave threats to public safety and national security) in the NPIAS.²⁰²

71. With respect to our proposal to clarify that only outages that potentially affect critical communications at an airport should be reported, we sought comment on defining the phrase “critical communications.” From 1994 through 2004, under 47 CFR § 63.100(a)(6), the Commission defined outages affecting “critical communications” at airports. We also noted that, in 2013, the Commission received 117 reports of airport-related outages, none of which appeared to have implicated critical communications under this prior Part 63 standard. We added that, were we to clarify that our intent was to receive reports only of outages that affected critical communications at airports, then few (if any) outages at an airport would rise to the threshold of being reportable, which in turn would represent an affirmative cost savings to communications providers.²⁰³

72. In 2004, the Commission proposed to incorporate, but ultimately did not adopt, the Part 63 definition of an outage that “potentially affects” an airport:

- (i) disrupts 50 percent or more of the air traffic control links or other FAA communications links to any airport; or
- (ii) has caused an Air Route Traffic Control Center (ARTCC) or airport to lose its radar; or
- (iii) causes a loss of both primary and backup facilities at any ARTCC or airport; or
- (iv) affects an ARTCC or airport that is deemed important by the FAA as indicated by FAA inquiry to the provider’s management personnel; or
- (v) has affected any ARTCC or airport and that has received any media attention of which the communications provider's reporting personnel are aware.²⁰⁴

b. Comments

73. Most commenters agree that we should adopt the proposal in the *Notice* to narrow the scope of airports to only those designated PR in NPIAS.²⁰⁵ On the issue of the types of communication outages that would be reportable, commenters agree that only outages that potentially affect critical communications at an airport should be considered, but raised some concerns. CenturyLink, for example, notes that while it generally supports the proposal to clarify what constitutes “critical communications,” “there is some question on the details of the NPRM’s proposal to define what outages potentially affect an airport and would be reportable,” believing the *2004 Part 4 NPRM* definition was not sufficiently clear on how providers would be able to assess when 50 percent of an airport’s air traffic control links are disrupted, along with vagueness on how providers would be notified of airports “deemed important” by

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 infrastructure serving such airports, i.e., air traffic control or other FAA communications links[,] and to restore such language to Section 4.5 of the rules. “) *Id.* at 5.

²⁰² *Notice*, 30 FCC Rcd at 3221, para. 43.

²⁰³ *Id.* at 3221, para. 44.

²⁰⁴ *Id.* at 3220-21, para. 42, *citing New Part 4 of the Commission's Rules*, Notice of Proposed Rulemaking, 19 FCC Rcd 3373, 3406, app. A (2004) (*2004 Part 4 NPRM*).

²⁰⁵ *See, e.g.*, ATIS Comments at 10; AT&T Reply at 3-4; CenturyLink at 5-6; ITTA Reply at 5-6; Sprint Comments at 9-10; Verizon Comments at 11-12; *but see* Comcast Comments at 7 (“special offices and facilities’ should continue to include the nuclear power plants and airports that fall within section 4.5(b) pursuant to existing protocols, which were not affected by the dissolution of NCS.”)

the FAA.²⁰⁶ Similarly, ATIS supports limiting outage reporting that those related to critical communications, but notes that “service providers will need to be able to determine when an outage impacts critical communications (such as primary and secondary backup facilities or 50 percent of the air traffic control links).”²⁰⁷

c. Discussion

74. On whether to narrow the scope of airports covered by our rules, we agree that the rule as currently written is unnecessarily broad. The airport-originating reports received by the Commission in recent years have generally related to outages within the retail sections of an airport. We agree with commenters that requiring providers to report these outages represents a substantial financial and administrative burden on those providers. Moreover, we do not believe that eliminating communications outage reporting from non-primary commercial service and reliever airports will negatively impact the safe operation of our nation’s airports and air travel system. We therefore amend section 4.5(b) to limit the requirement of reporting outages that “potentially affect” an airport to only those determined by the FAA to provide primary commercial service.²⁰⁸

75. On the issue of limiting the type of communications subject to this rule, we clarify that our concern is only with outages that potentially affect critical communications at covered airports. We note that the Commission first adopted the “five-point” definition in 1994, to provide clarity and thoroughness in reporting, as 47 CFR 63.100(a)(6),²⁰⁹ although it did not apply this definition in 47 CFR part 4.5(c).²¹⁰ In the *Notice*, we posited that, even though the Commission refrained from adopting it in 2004, the definition from former rule 47 CFR § 63.100(a)(6) would be appropriate to make clear that for reporting purposes, only outages that impact critical communications at an airport are of concern.²¹¹ We

²⁰⁶ CenturyLink Comments at 5-6 (footnote omitted).

²⁰⁷ ATIS Comments at 10-11; *see also* AT&T Reply at 3-4 (footnotes omitted) (“AT&T also agrees with CenturyLink and ATIS that it is important for the Commission both to define “critical communications” in such a way that enables providers to readily determine when an outage is reportable under this standard and to ensure that providers could implement this new standard at little to no additional cost”).

²⁰⁸ Primary Commercial Service Airports are publicly-owned airports that the Secretary of Transportation deems to have more than 10,000 passenger boardings each calendar year and receives scheduled passenger service. Passenger boardings refer to revenue passenger boardings on an aircraft in service in air commerce whether or not in scheduled service. The definition also includes passengers who continue on an aircraft in international flight that stops at an airport in any of the 50 States for a non-traffic purpose, such as refueling or aircraft maintenance rather than passenger activity. *See* 47 U.S.C. § 47102. *See also* Federal Aviation Administration, Passenger Enplanements at All Commercial Service Airports (By Rank) (Sept. 22, 2015), http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy14-commercial-service-enplanements.pdf.

²⁰⁹ *Amendment of Part 63 of the Commission's Rules to Provide for Notification by Common Carriers of Service Disruptions*, Second Report and Order, 9 FCC Rcd 3911, 3927-28, para. 39 (1994) (“[u]nder the voluntary system of outage reporting that has been in place since June 1, 1992, the FCC has received reports of outages that affect major airports . . . In addition to outages affecting 50% of the FAA ARTCC circuits, AT&T reported to the FCC: any outage that caused an ARTCC or major airport to lose its radar; any ARTCC or major airport outage that was likely to be publicized; any outage that caused a loss of both primary and backup facilities at any ARTCC or major airport; and any outage to an ARTCC or major airport that is deemed important by the FAA as indicated by FAA inquiry to the carrier management personnel assigned to the FAA region in which the outage occurred.”)

²¹⁰ Current Part 4 rules (Section 4.5(c)) require “All outages that potentially affect communications for at least 30 minutes with any airport that qualifies as a ‘special office and facility’ . . . shall be reporting in accordance with the provisions of §§4.11 and 4.13.” 47 CFR § 4.5(c) (emphasis added). *2004 Part 4 Order*, 19 FCC Rcd at 16863, 16867, 16924, paras. 57, 65, Appendix B.

²¹¹ *Notice*, 30 FCC Rcd at 3220-21 paras. 42, 44 (“The definition of an outage potentially affecting an airport proposed in the original Part 4 rulemaking proceeding . . . would exclude communications such as these not directly

(continued....)

find that the concerns raised by CenturyLink about ambiguity in the definition from the *2004 Part 4 Notice* are unfounded.²¹² Regarding CenturyLink's concern about a provider's ability to ascertain when 50 percent of an airport's control links are disrupted, we conclude that providers have sufficient ability to quantify outages at this level, which is a rational expectation of a provider's network monitoring practices and capability. Thus, the definition the Commission adopted in 1994 in part 63, used through 2004, and proposed to incorporate into Part 4 in 2004, and does incorporate here, provides necessary and sufficient clarity. We note that section 63.100(a)(6) had long been in force and that carriers should already be familiar with this definition. For example, we note Sprint's 2004 petition for reconsideration requesting that the Commission, *inter alia*, require reporting only in those scenarios defined by the "previous outage reporting rules, *see* 47 CFR § 63.100(a)(6)."²¹³ Regarding CenturyLink's concern regarding whether an airport has been deemed "important" by the FAA, we believe our narrowing the scope of airports covered by our rules resolves this issue, adding only that providers that serve airports must make themselves aware of the category of those airports (*i.e.*, we do not anticipate or expect the airport itself to notify providers as to the airport's FAA classification).

76. We note that commercial aviation is increasingly dependent on information systems that are not collocated with airport facilities and invite comment in the Further Notice as to whether non-airport critical aviation information facilities should be eligible for outage reporting perhaps as enrollees in the previously mentioned TSP Levels 3 and 4.²¹⁴

4. Reporting Obligations of Satellite and Terrestrial Wireless Service Providers as to "Special Offices and Facilities"

a. Background

77. In 2004, the Commission determined that because the critical communications infrastructure serving airports is landline-based, satellite and terrestrial wireless communications providers were exempt from reporting outages potentially affecting airports.²¹⁵ CTIA, Cingular Wireless and Sprint each filed petitions arguing that wireless providers should be exempt from reporting outages pertaining to all other "special offices and facilities,"²¹⁶ on the grounds that the rationale for excluding wireless carriers from outage reporting for airports applies equally to all special offices and facilities, that is, that wireless carriers lacked dedicated access lines to all special offices and facilities. In the *Notice*, we asked whether, in spite of the continued growth in the use of wireless networks, we should extend the satellite and terrestrial wireless exemption to all "special offices and facilities."²¹⁷

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related the role of airports as critical transportation infrastructure. Should the Commission adopt this proposed [*i.e.*, five-point] definition?").

²¹² *See* CenturyLink Comments at 5-6, "[i]t is unclear if providers would be able to assess with specificity when 50 percent of an airport's air traffic control links are disrupted and also vagueness around how providers would be notified of airports 'deemed important' by the FAA."

²¹³ *See generally* Sprint Petition. We note here and in the *Order on Reconsideration* section of this document that we grant Sprint's request to clarify that only "critical communications" are subject to our reporting requirements.

²¹⁴ *See infra*, section V.F., para. 195. Facilities are eligible for TSP Level 3 or 4 prioritization if they (3) support public health, safety, and maintenance of law and order activities or (4) maintains the public welfare and the national economic system. *See* U.S. Department of Homeland Security, TSP Eligibility, <http://www.dhs.gov/tsp-eligibility>.

²¹⁵ *2004 Part 4 Order*, 19 FCC Rcd at 16867, para. 66; *see also* 47 CFR §§ 4.9(c)(2)(iii), (e)(4).

²¹⁶ CTIA Petition at 2-3; Cingular Petition at 4; Sprint Petition at 3-4; *see also* Comments of Dobson Communications Corp., ET Docket No. 04-35 at 6-7 (Mar. 2, 2005).

²¹⁷ *Notice*, 30 FCC Rcd at 3222 paras. 46-47.

b. Comments

78. Commenters on this issue all agree that the current exemption afforded satellite and terrestrial wireless providers with respect to airports ought to be retained, and that such providers further should be exempt from reporting outages potentially affecting all special offices and facilities. CCA notes that because wireless providers generally do not have their own equipment installed at the special office or facility, it is not feasible for the provider to determine whether one of its devices is being used within the special office or facility, making it impossible for the carrier to know whether an office or facility has been impacted by an outage.²¹⁸ CTIA states that “[w]ireless networks provide undifferentiated service to all end users. That was true in 2004 and remains true today. Even with the growth of wireless in everyday life, ‘wireless providers do not generally assign dedicated access lines to specific end users, and therefore do not have dedicated access lines for the critical portions of any of the special offices and facilities.’”²¹⁹

79. Sprint supports extending the wireless providers’ exemption to all special offices and facilities, arguing that, as with airports, “the communications infrastructure serving other special offices and facilities remain primarily ‘landline based,’” and that unless a wireless carrier provides a dedicated access line to a special office or facility, it has no way of knowing whether one of its phones was being used by personnel at such office or facility.²²⁰

c. Discussion

80. Although wireless service has become ubiquitous in many respects throughout the United States, we have not observed special offices and facilities adopting such service for their critical communications, and otherwise abandoning wireline-based communications. As CTIA points out, for example, the Department of Defense (DoD) commented in our *Technology Transitions* proceeding that DoD and federal executive agencies continue to rely heavily on wireline TDM-based networks and services and would do so for the foreseeable future.²²¹ We will, therefore, continue to exempt satellite and terrestrial wireless providers from reporting outages potentially affecting airports, and will extend that exemption to all special offices and facilities. To the extent our decision today responds affirmatively to the requests of CTIA, Cingular, and Sprint to exempt wireless carriers from being required to report outages potentially affecting all special offices and facilities, we grant their petitions.

E. Part 4 Information Sharing**1. Background**

81. Section 4.2 of our rules provides that reports filed in NORS are presumed confidential, and thus withheld from routine public inspection.²²² This presumption recognizes both the “likelihood of substantial competitive harm from disclosure of information in outage reports” and the Commission’s concern that “the national defense and public safety goals that we seek to achieve by requiring these outage reports would be seriously undermined if we were to permit these reports to fall into the hands of

²¹⁸ CCA Comments at 4.

²¹⁹ CTIA Comments at 10-11, *citing* CTIA Petition at 2.

²²⁰ Sprint Comments at 10; *see also* Verizon Comments at 11 (“wireline providers remain the principal (if not exclusive) providers of high capacity services and facilities to the Federal Aviation Administration and commercial airport authorities”).

²²¹ CTIA Comments at 11, *citing* Comments of United States Department of Defense and All Other Executive Agencies (“DoD/FEA”), GN Docket No. 13-5 (Technology Transitions), at 1 (filed July 8, 2013). *See also* *Technology Transitions Order*, 29 FCC Rcd at 1447-48, para. 42.

²²² 47 CFR §§ 0.457(d)(vi), 4.2.

terrorists who seek to cripple the nation's communications infrastructure."²²³ The Commission routinely shares NORS reports with the Office of Emergency Communications at the Department of Homeland Security (DHS), which may "provide information from those reports to such other governmental authorities as it may deem to be appropriate,"²²⁴ but the Commission does not share NORS information directly with state governments. In 2009, the California Public Utilities Commission (CPUC) filed a petition requesting that the Commission amend its rules to permit state agencies to directly access the NORS database.²²⁵

82. The *Notice* proposed to grant state governments "read-only access to those portions of the NORS database that pertain to communications outages in their respective states," conditioned on a certification that each state "will keep the data confidential and that it has in place confidentiality protections at least equivalent to those set forth in the federal Freedom of Information Act (FOIA)."²²⁶ The Commission sought comment on this proposal, including key details such as how to "ensure that the data is shared with officials most in need of the information while maintaining confidentiality and assurances that the information will be properly safeguarded;" whether there should be limitations on states' use of NORS data; and whether such access should be provided "only on the condition that such access replace any separate outage reporting required under state law."²²⁷ We also sought comment on whether states' use of NORS data should be restricted to activities relating to its "traditional role of protecting public health and safety" and, if so, what activities such a role would encompass.²²⁸

83. The *Notice* also noted that the Commission has received occasional requests from federal agencies other than DHS for direct access to NORS data and proposed to act on such requests on a case-by-case basis.²²⁹ We sought comment on whether federal partners seeking NORS data should be required to specify how they intend to use the information and with whom they intend to share it, as well as what security and confidentiality protections should be required to ensure that such information is accessed only by necessary parties.²³⁰ In addition, the Commission sought comment on whether information collected under part 4 should be shared directly with the National Coordinating Center for Communications (NCC), a government-industry initiative led by DHS representing 24 federal agencies and more than 50 private-sector communications and information technology companies.²³¹ Specifically,

²²³ *2004 Part 4 Order*, 19 FCC Rcd at 16855, para. 45; *see also id.* at para. 40 (observing that outage reports "will contain data that, though useful for the analysis of past and current outages in order to increase the reliability and security of telecommunications networks in the future, could be used by hostile parties to attack those networks, which are part of our nation's critical information infrastructure").

²²⁴ *Id.* at 16856, para. 47 (making NORS reports available to DHS "in encrypted form and immediately upon receipt").

²²⁵ *See* Petition of the California Public Utilities Commission and the People of the State of California, ET Docket No. 04-35 (Nov. 12, 2009) (*CPUC Petition*); Public Safety and Homeland Security Bureau Seeks Comment on Petition for Rulemaking by the California Public Utilities Commission Requesting That State Public Utilities Commissions Be Granted Direct Access to the Commission's Network Outage Reporting Systems, ET Docket No. 04-35, *Public Notice*, DA 10-220 (2010).

²²⁶ *Notice*, 30 FCC Rcd at 3224, para. 51.

²²⁷ *Id.* at 3224, paras. 52-53.

²²⁸ *Id.* at 3224, para. 53.

²²⁹ *Id.* at 3224-25, para. 54. *See also* 47 CFR § 0.442 (setting forth procedures for disclosure to other federal government agencies of information submitted to the Commission in confidence).

²³⁰ *Notice*, 30 FCC Rcd at 3224-25, para. 54.

²³¹ *Id.* at 3225, para. 55. *See also* Department of Homeland Security, National Coordinating Center for Communications, <http://www.dhs.gov/national-coordinating-center-communications> ("As part of DHS' National Cybersecurity and Communications Integration Center, the National Coordinating Center for Communications (NCC) continuously monitors national and international incidents and events that may impact emergency

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we sought comment on whether there is “a subset of data collected under Part 4 that the Commission could share with the NCC while upholding the confidentiality presumption,” as well as whether providing such information directly from the Commission would discourage service providers from voluntary participation in the NCC.²³²

2. Comments

84. Commenters generally support providing state and federal officials with direct access to NORS, as long as there are sufficient security and confidentiality protections to prevent disclosure to competitors or hostile parties. The National Association of Regulatory Utility Commissioners (NARUC) notes that it unanimously adopted a resolution in support of the CPUC Petition, adding that “[w]hile California filed the Petition on its own behalf, and some States do receive certain outage information directly from carriers, *all* States share the need for immediate, secure and confidential access to the service outage detail provided in NORS.”²³³ ATIS “does not oppose the sharing, with appropriate safeguards, of NORS data with states,” but “believes that it should be provided only to those states that agree to abide by the confidentiality and other restrictions established by the Commission.”²³⁴ COMPTTEL asserts that “[t]here is no question that the public interest would be served if state governments were made and kept aware of communications outages within their borders,” but urges similar confidentiality protections.²³⁵

85. Commenters disagree, however, on many of the details of implementation for sharing information with state entities, including the nature and extent of confidentiality measures and whether the Commission should attach conditions to the use of information obtained from NORS. The CPUC asserts that the Commission should adopt its proposal “without any of the additional requirements or restrictions . . . proposed by industry parties.”²³⁶ Service providers, by contrast, support a broad range of conditions such as: limitations on the number and job description of state personnel with access to NORS,²³⁷ security training or nondisclosure agreements for such personnel,²³⁸ data breach notifications to

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communications. Incidents include not only acts of terrorism, but also natural events such as tornadoes, floods, hurricanes and earthquakes.”)

²³² *Id.* at 3225, para. 55.

²³³ NARUC Comments at 3 (emphasis in original). *See also* National Association of State 911 Administrators (NASNA) Comments at 2 (“NASNA supports the Commission’s proposal to grant states read-only access to those portions of the NORS database concerning outages in their respective states.”); New York Public Service Commission (NYPSC) Comments at 2 (“NYPSC agrees with the FCC that allowing states access to NORS data will ‘advance compelling state interests in protecting public health and safety in an efficient manner.’”). *Cf.* AT&T Comments at 25 (“States have failed to demonstrate that access to NORS is necessary but if the Commission is going to grant read-only access to state commissions, it must first implement numerous safeguards.”).

²³⁴ ATIS Comments at 11.

²³⁵ COMPTTEL Comments at 8. *See also* CenturyLink Comments at 4; ITTA Reply at 6; NTCA Reply at 10; T-Mobile Reply at 9-10.

²³⁶ CPUC Reply at 8. *See also* Massachusetts Department of Telecommunications and Cable (MDTC) Comments at 3-4 (“[T]here is no need to place additional restrictions on a State’s access to the NORS database, or limit a State’s use beyond accessing only state-specific data.”); Michigan Public Service Commission (MPSC) Comments at 7 (“Restricting the information that states can access regarding service outages would obscure the true picture of the providers’ services; rendering the reporting – and any conclusions drawn thereon – incomplete.”)

²³⁷ *See* AT&T Comments at 27 (recommending that access be limited to three employees in each state); ATIS Comments at 12 (urging limitations on the number of personnel who may access data and exclusion of private contractors); CenturyLink Comments at 4 (“Only state public utility commission officials should be able to access this information, not third parties.”); COMPTTEL Comments at 10 (“Only those state employees that have a need to review NORS data to protect the health and safety of the state’s residents should be given access.”); CTIA Comments at 13-14 (“Under no circumstances should a state or federal agency be permitted to make public or share

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the Commission,²³⁹ to affected service providers,²⁴⁰ or to both,²⁴¹ tracking or auditing of states' use of NORS information,²⁴² and loss of access or other penalties for states that fail to maintain confidentiality.²⁴³ Industry commenters also question whether a certification of confidentiality protections "at least equivalent to FOIA" would be an effective safeguard in light of variations in state open records laws²⁴⁴ and the tendency of some state courts to construe such laws in favor of disclosure.²⁴⁵ Consequently, several commenters urge the Commission to explore mechanisms other than FOIA and its state equivalents as a basis for stronger legal protections for NORS data.²⁴⁶ Some commenters urge the Commission to preempt state open records laws to the extent they could allow disclosure of NORS information,²⁴⁷ while others suggest "a rule with language similar to the statutory language that Congress enacted to govern a federal agency's sharing of homeland security information with a state government."²⁴⁸ Commenters point to several other contexts in which the Commission has shared information on a confidential basis with state counterparts, such as the existing processes for sharing state-specific Form 477 data on broadband subscribership and numbering resources from the North American Numbering Plan Administration (NANPA).²⁴⁹ But the record also reflects concerns that these

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the data with parties outside its direct employ."); Verizon Reply at 8 ("At this time, the Commission should limit access to state regulatory commissions . . . [and] forbid state commissions from forwarding confidential NORS data reports to other state agencies."). *Cf.* Intrado Reply at 18-19 ("Another issue that undermines the confidentiality of NORS data would be the sheer number of state personnel that would have access to NORS data. It would be impossible for the FCC to restrict access to NORS data to a small group of critical state personnel in each state.")

²³⁸ AT&T Comments at 27; ITTA Reply at 7; NTCA Reply at 10; Sprint Comments at 12.

²³⁹ AT&T Comments at 27-28; Sprint Comments at 12; T-Mobile Reply at 10.

²⁴⁰ CenturyLink Comments at 4; ITTA Reply at 6.

²⁴¹ ATIS Comments at 12; CTIA Comments at 13-14; NTCA Reply at 10.

²⁴² AT&T Reply at 11; ATIS Comments at 12; CTIA Comments at 14-15; ITTA Reply at 7. *See also* Verizon Comments at 12 ("The system should also notify individual service providers when an agency has requested authorization to view the NORS reports so that affected service providers can comment on the adequacy of state confidentiality protections.").

²⁴³ ATIS Comments at 12; ITTA Reply at 7; Sprint Comments at 12; T-Mobile Reply at 10.

²⁴⁴ AT&T Comments at 25 (arguing that "states cannot guarantee that carriers' reports would not be subject to public information requests" because "any current state rule or law is subject to the vagaries of the state legislature, which could easily undo any current exemption outage reports may have under the state's open-record laws"); CTIA Comments at 14 (urging the Commission to "analyze any Sunshine or public access laws that may put confidential reports collected through NORS at risk of disclosure").

²⁴⁵ Intrado Reply at 15 ("Many state public records laws will not adequately protect NORS data. . . . In many states, these laws are liberally construed in favor of disclosure, while exemptions to the laws aimed at shielding records from public disclosure are narrowly construed.").

²⁴⁶ Sprint Comments at 12 ("The Commission should consider whether FOIA is the appropriate benchmark for this certification or whether other certification language should be used to ensure this data is given the highest level of protection from disclosure.") ITTA Reply at 7 (urging consideration of standards other than FOIA).

²⁴⁷ AT&T Comments at 27; COMPTTEL Comments at 9-10; NTCA Reply at 10.

²⁴⁸ COMPTTEL Comments at 9 (citing 6 U.S.C. § 482(e)).

²⁴⁹ CPUC Reply at 6 ("States' access to the NORS database should be modeled after the FCC's successful processes for sharing confidential numbering data and confidential Form 477 data with states."); MDTC Comments at 3-4 ("[A]s experience with the Form 477 and NANPA databases show, there is no need to place additional restrictions on a State's access to the NORS database, or limit a State's use beyond accessing only state-specific data."); MPSC Comments at 4 ("The MPSC suggests that the FCC utilize a process similar to the registration process for states' access to Form 477 data to ensure the integrity of confidential information is not compromised.").

models may be inadequate to provide states with real-time access to NORS data²⁵⁰ or to provide state-specific data on outages affecting multiple states.²⁵¹ Intrado further suggests that outage information could not realistically be shared with states on a confidential basis without an extensive redesign of the NORS database and associated form fields.²⁵²

86. States and service providers also dispute whether use of NORS data should be limited to the states' "traditional role of protecting public health and safety," a phrase that first appeared in the CPUC Petition²⁵³ but here receives support from industry commenters as a condition on states' access to NORS.²⁵⁴ AT&T, for example, comments that "the Commission should restrict state commissions' use of the NORS data to evaluating the cause of outages to monitor communications network functionality within a state."²⁵⁵ Sprint "believes states' use of NORS data should be restricted to activities . . . such as using the data to coordinate with federal departments or to assist carriers in prioritizing sites to get back online."²⁵⁶ Verizon contends that "[a]gencies requesting access should show that their responsibilities relate to a bona fide public safety, national security, emergency preparedness or 911/first responder function," and that "[a]gencies should use the information for their public safety functions, limited to the geographic area subject to the agency's jurisdiction, and not for any public docket or other public proceeding."²⁵⁷ State governments generally agree that they should only receive information on outages within their geographic boundaries but oppose other limitations on their use of NORS data.²⁵⁸ Michigan, for example, asserts that "[r]estricting the information that states can access regarding service outages would obscure the true picture of the providers' services . . . rendering the reporting – and any conclusions drawn thereon – incomplete."²⁵⁹ CPUC argues that "a state's certification – that it will keep NORS data obtained from the FCC confidential and that it has confidentiality protections at least equivalent to FOIA – should be the only condition for a state to obtain direct access to the NORS database."²⁶⁰

87. Commenters also disagree on the extent to which direct access to NORS data should replace state-level outage reporting requirements. Without routine access to NORS data, many states independently require communications providers to file network outage reports with their public utility

²⁵⁰ CPUC Ex Parte, Aug. 21, 2015 at 2 (clarifying that "CPUC seeks real-time direct access to all California-specific outage reports (unlike Form 477 and numbering data, both of which are provided to states well after the FCC receives them), because of the immediate need for states to swiftly address public safety and other concerns that arise during and after outages").

²⁵¹ Intrado Reply at 25 ("[T]he drop-down menu in the NORS form only contains one field for the state location of an event, and if the event impacts multiple states, the forced list choice is 'multi-state.' Reporting entities are left to try to further refine the location in the 'free form' text field; however, as this field is unrestricted, it would not be useful in sorting data by state.").

²⁵² Intrado Reply at 25.

²⁵³ CPUC Petition at 14.

²⁵⁴ See, e.g., CenturyLink Reply at 4; COMPTTEL Comments at 10; T-Mobile Reply at 9-10; XO Comments at 7-8.

²⁵⁵ AT&T Comments at 28.

²⁵⁶ Sprint Comments at 12-13.

²⁵⁷ Verizon Comments at 12.

²⁵⁸ MDTC Comments at 3-4 ("[T]here is no need to place additional restrictions on a State's access to the NORS database, or limit a State's use beyond accessing only state-specific data.").

²⁵⁹ MPSC Comments at 7.

²⁶⁰ CPUC Reply at 8.

commissions or similar agencies.²⁶¹ Industry commenters argue that “sharing appropriate data with state agencies could minimize the burden on providers for filing multiple reports given that the content of some state outage reporting overlaps with Part 4 reporting,”²⁶² but also that “the Commission should condition a state’s access to NORS data on the state’s waiver or elimination of any independent outage reporting requirement imposed by state law.”²⁶³ Intrado further contends that “[d]ual reporting is unnecessary, unduly expensive and inappropriate,” and that “[n]ot every state needs access to NORS.”²⁶⁴ State commissions tend to disagree, arguing that states should remain free to adopt their own independent requirements.²⁶⁵ New York, for example, “anticipate[s] that any information obtained through NORS would be complementary to existing state protocols and resources for ensuring the reliability and resiliency of the state’s communications networks and strengthening 911 systems.”²⁶⁶ Massachusetts urges the Commission to “refrain from preemption, and allow state entities the opportunity to assess their reporting requirements and eliminate any redundancies on their own.”²⁶⁷ Michigan, however, eliminated its own outage reporting requirements in 2011 and observes that “[a] single database where providers can submit outage information and authorized stakeholders can access such information is an efficient model for all parties involved.”²⁶⁸

3. Discussion

88. The record reflects broad agreement that state and federal partners would benefit from more direct access to NORS data, and we conclude that such a process would serve the public interest if implemented with appropriate and sufficient safeguards. But, with competitively sensitive information and critical communications infrastructure at stake, we also conclude that this process requires more careful consideration of details that may determine the long-term success and effectiveness of the NORS program. Accordingly, while we agree that other FCC processes may be helpful models in developing appropriate procedures for sharing NORS data, we are not persuaded that existing processes for information sharing can be replicated in the context of NORS without important refinements.

89. In light of the significant security and confidentiality concerns described above, as well as federalism concerns that may be inherent in any national coordination of outage reporting

²⁶¹ See, e.g., California Public Utilities Commission, Decision Adopting General Order 133-C and Addressing Other Telecommunications Service Quality Reporting Requirements, D.09-07-019 (Jul. 9, 2009), http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/104429.htm.

²⁶² XO Comments at 8. See also CenturyLink Reply at 4 (arguing that state access to NORS could “mak[e] outage reporting more consistent and efficient across state and federal authorities” so long as such access replaces any separate outage reporting under state law based on different criteria and timeframes).

²⁶³ COMPTTEL Comments at 10. See also AT&T Comments at 28 (“[T]he Commission should condition a state’s access to the NORS database on that state agreeing not to impose state-specific outage reporting requirements on reporting entities.”); ATIS Comments at 11 (supporting NORS access only for states that “agree to permanently sunset or otherwise eliminate any inconsistent state level reporting obligations”).

²⁶⁴ Intrado Reply at 20-21 (citing state-specific outage reporting requirements in Colorado, Ohio, South Carolina, Virginia, Washington, Pennsylvania, and Vermont).

²⁶⁵ CPUC Comments at 2-3 (noting that “California is currently considering updates or amendments to its service quality rules that may include reporting thresholds that are lower than those the Commission’s Part 4 rules currently require”).

²⁶⁶ NYPSC Comments at 3.

²⁶⁷ MDTC Comments at 4-5 (“Once State entities are able to access the NORS database, States should take action to amend or eliminate redundant outage reporting requirements. However, as the FCC is aware, State entities collect different information than is contained in the NORS database, and should not be foreclosed from making their own determinations as to whether data is duplicative.”).

²⁶⁸ MPSC Comments at 2-3.

requirements, we find that the Commission's part 4 information sharing proposals raise a number of complex issues that warrant further consideration.²⁶⁹ We seek comment in the Further Notice below with respect to how NORS data from broadband providers could be properly shared with state and federal entities other than DHS, including instances where state law may prohibit information sharing.²⁷⁰ Furthermore, to assist the Commission in addressing these issues, we direct the Bureau to study these issues, and develop proposals for the Commission consideration regarding how NORS filings and information collected from all part 4 providers could be shared in real time with state commissions, with other federal partners, and with the NCC, keeping in mind current information sharing privileges granted to DHS.²⁷¹

F. Cost-Benefit Analysis

90. In the *Notice* we provided estimates of the annual industry-wide cost of adoption of the proposed rules.²⁷² In total, we estimated that industry-wide reporting costs would fall by \$307,520 due to a net decrease of 1,922 reports per year.²⁷³ While several commenters argued that our per-report cost

²⁶⁹ While the vast majority of comments in this proceeding focused on sharing NORS reports with states, our proposals to share NORS data with other federal agencies and with the NCC raise similar implementation challenges and are closely intertwined. Without a more developed record regarding any unique aspects of sharing NORS data directly with other federal partners or with the NCC, we conclude that all of these issues should be addressed together through the recommendations developed by the Bureau. We also note that the Commission recently initiated a proceeding regarding outage reporting requirements for submarine cable licensees, and this includes possible interagency coordination. *See Improving Outage Reporting for Submarine Cables and Enhancing Submarine Cable Outage Data*, Notice of Proposed Rulemaking, 30 FCC Rcd 10492, 10509, paras. 45-47 (2015). To the extent that these proceedings raise common issues, we direct the Bureau to consult with the International Bureau, and to consider submarine cable outage reporting in its recommendations for implementation of NORS information sharing.

²⁷⁰ *See infra* Section V.B.5.

²⁷¹ To the extent new outage reporting requirements may constitute additional NORS filings and information collected, we seek further comment below regarding the NORS information sharing of this additional information. *See infra* Section V.B.5.

²⁷² *Notice*, 30 FCC Rcd at 3209, para. 8.

²⁷³ This net cost decrease is due to a revision in the metric and threshold for reporting major facility outages, from DS3 to OC3, and 1,350 DS3 minutes to 667 OC3 minutes, respectively. This reduction in reports more than compensates for the additional reporting requirements pursuant to this Report and Order. All reports are assumed herein to impose the same cost: 2 hours of time, at a rate of \$80 per hour, or a total cost per report of \$160. *See 2015 Part 4 Notice*, 30 FCC Rcd at 3210-11, para. 13, note 19-20. In the *Notice*, we estimated that raising the threshold for reporting major facility outages would result in 2,835 fewer reports. *See Notice*, 30 FCC Rcd at 3214, 23. Multiplying 2,835 times \$160 yields a cost savings of \$453,600. We also estimated that our clarification of outages relating to airports and other "special offices and facilities" would reduce the number of reports filed by 117 reports. *See id.* at 3221, para. 44. Multiplying 117 times \$160 yields a cost savings of \$18,720. The sum of these cost savings is \$472,320 (for a decrease of 2,952 reports at \$160 each.). Outages that "significantly degrade 911 communications" are relatively rare, and no such outage occurred in 2015. Accordingly, we estimate that there would be at most 10 reports per year. The projected cost increases are associated with requirements for reporting outages that significantly degrade 911 communications, estimated at 10 reports at \$160 per report, for a cost of \$1,600; and simplex outages that persist 96 hours or longer, estimated at 510 reports at \$160 per report, for a cost of \$81,600, for simplicity. We estimated that the number of simplex reports would double if our threshold was reduced from 120 hours to 48 hours. *See id.* at 3210-11, 3216, para. 13, 30 and n. 52. Here we assume that there would be at most 50% more simplex reports because we reducing our threshold from 120 hours to 96 hours. The total cost increases, then, are \$1,600 + \$81,600 = \$83,200 (for an increase of 520 reports at \$160 each). As noted above, we are not persuaded by AT&T's unsupported claim that these costs will be six times greater. Yet, even if this cost increase were to double what we are estimating, the increase would be \$329,600 – a minimal amount in light of the potential benefits. The combined estimated impact of this Order will be to raise the number of reports by 520, while

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estimates were too low, only AT&T provided a revised quantitative estimate. AT&T argued that it spends approximately twelve hours to prepare and file outage reports, in contrast to our estimate of two hours.²⁷⁴ Although we are not convinced that twelve hours are necessary, we note that using AT&T's figure, the resulting decrease in costs would be six times our estimate, or \$1,845,120. In either case, we conclude that the rule changes adopted in this *Report and Order* will have the overall effect of reducing reporting costs.

91. As to benefits, our part 4 rules enhancements will ensure the Commission receives the appropriate type and quality of outage and operational status information to allow us to continue to fulfill our statutory obligation to promote "safety of life and property" by protecting the nation's communications networks. The current part 4 outage reporting rules played a significant and well-documented role in the Commission's successful efforts to promote more reliable and resilient communications networks.²⁷⁵ The Commission's receipt of data on major transport facility outages, wireless outages, outages that significantly degrade communications to PSAPs, and outages affecting special offices and facilities will enable it to adapt this established practice to a wider cross-section of the critical communication infrastructure.

92. We further believe that the benefits of the adopted rules will substantially exceed the minimal costs expected to be imposed by some of these rules, and we expect that the combined effect of all these rules will be to reduce the costs imposed on affected parties.²⁷⁶ Outage reporting provides the Commission with critical data on communications reliability that it has no means of gathering on a consistent and reliable basis from any other source. Absent these rules, the Commission lacks adequate visibility into the reliability of major transport facilities and wireless communications infrastructure, and has inadequate visibility into degradations of special offices and facilities as well as communications to PSAPs. This lack of visibility hinders the Commission's ability to discharge its public safety responsibilities. The data gathered by these outage reports will permit Commission staff, working closely with providers and industry working groups, to identify and address systemic vulnerabilities. Such collaborative efforts have led to measurable improvements in network reliability and resiliency, and to the formulation of policies to promote more reliable and secure communications.²⁷⁷ Moreover, outage reports, particularly in the early stages of a communications disruption, provide critical situational awareness to the Commission that enable it to participate effectively in emergency response and service restoration efforts.

V. FURTHER NOTICE OF PROPOSED RULEMAKING

A. Background

93. As service providers transition from legacy network facilities to IP-based networks, the Commission must continue to safeguard the reliability and resiliency of all of these interrelated systems. As we have observed before, broadband networks and services increasingly characterize the environment for the nation's 9-1-1 and NG911 emergency communications and, thus, are central to the nation's emergency preparedness, management of crises, and essential public safety-related communications.²⁷⁸

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simultaneously reducing the number of reports by 2,952, for a net decrease of 2,432 reports per year. The cost savings associated with the net decrease of 2,432 reports at \$160 each, or \$389,120.

²⁷⁴ AT&T Comments at 3.

²⁷⁵ See, e.g., Network Reliability Steering Committee Annual Report (rel. 2005), http://www.atis.org/NRSC/Docs/2004_Annual_Report.pdf.

²⁷⁶ See *supra* note 284.

²⁷⁷ See *id.*

²⁷⁸ See *Improving 911 Reliability; Reliability and Continuity of Communications Networks, Including Broadband Technologies*, PS Docket Nos. 13-75, 11-60, Report and Order, 28 FCC Rcd 17476, 17479, para. 9 (2013) ("NG911 (continued....)

To meet the challenge of assuring broadband networks in order to carry out its foundational public safety mission,²⁷⁹ the Commission must maintain visibility into TDM-based networks while simultaneously ensuring similar visibility into commercial IP and hybrid networks. Our current part 4 rules establish outage reporting requirements that are in many ways centered on “circuit-switched telephony” and circuits that involve a “serving central office.”²⁸⁰ The proposals in this Further Notice, among other things, aim to update the part 4 rules to ensure reliability of broadband networks used to deploy critical communications services, used both for emergency and non-emergency purposes. As discussed below, we believe the part 4 rules can likely provide the Commission with the necessary situational awareness about these broadband networks by updating them to (1) extend their application to broadband Internet access services (BIAS), and (2) revising the manner in which they apply to existing and future dedicated services to ensure a broadband emphasis.²⁸¹ These actions, we believe, will ensure that the Commission’s ability to monitor communications reliability and resiliency keeps pace with technological change and the broadband-based capabilities and uses of today’s evolving networks.

94. More specifically, we: (i) seek comment on proposed reporting requirements, metrics, and narrative elements for both BIAS and dedicated services outages and disruptions, including for network performance degradation; and (ii) propose to amend the Commission’s existing outage reporting requirements for interconnected VoIP to reflect disruptions resulting from network performance degradation. In addition, we seek further comment on two proposals raised in the *Notice* and aimed at increasing our awareness of certain outages: (i) reporting call failures in both the wireless and wireline/interconnected VoIP access networks; and (ii) reporting outages that affect large geographic areas but do not trigger the user-minute threshold because of sparse population.²⁸² We also seek comment on establishing outage reporting triggers for certain airport communications assets (“special offices and facilities”) designated as TSP Level 3 and Level 4 facilities. Finally, we seek to determine the most cost-

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networks ‘offer[] certain advantages over legacy technologies, including greater redundancy and reliability, the ability to provide more useful information for first responders, wider public accessibility (including to those with disabilities), and enhanced capabilities for sharing data and resources among emergency responders.’”) (citation omitted); *The Proposed Extension of Part 4 of the Commission’s Rules Regarding Outage Reporting to Interconnected Voice Over Internet Protocol Service Providers and Broadband Internet Service Providers*, PS Docket No. 11-82, Notice of Proposed Rulemaking, 26 FCC Rcd 7166, 7168, para. 4 (2011) (“The resilience of the broadband communications infrastructure directly impacts the emergency preparedness and readiness posture of the United States. [O]utages to broadband networks can have a significant impact on emergency services, consumers, businesses, and governments. The most practical, effective way to maintain emergency preparedness and readiness is to work continuously to minimize the incidence of routine outages.”) (citation omitted).

²⁷⁹ See 47 U.S.C. § 151 (A first principle of the Commission’s existence is its duty to ensure communications availability “for the purpose of the national defense”, and to “promote] safety of life and property through the use of wire and radio communication. . .”).

²⁸⁰ See, e.g., 47 C.F.R. § 4.3(a) and (g).

²⁸¹ In this Further Notice, we propose to use the term “dedicated service” to refer to those services defined in 2013’s *Special Access Data Collection Implementation Order*, i.e., “service that ‘transports data between two or more designated points, e.g., between an *End User*’s premises and a point-of-presence, between the central office of a local exchange carrier (LEC) and a point-of-presence, or between two *End User* premises, at a rate of at least 1.5 Mbps in both directions (upstream/downstream) with prescribed performance requirements that include bandwidth, latency, or error-rate guarantees or other parameters that define delivery under a *Tariff* or in a service-level agreement.’”). *Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, WC Docket No. 05-25, RM-10593, Report and Order, 28 FCC Rcd 13189, 13190, para. 1, n.1 and Appendix B – Definitions (WCB 2013) (*Special Access Data Collection Implementation Order*) (italics in original). Such services include “regulated and unregulated ‘special access’ service and its functional equivalents.” *Special Access Data Collection Implementation Order*, 28 FCC Rcd at 13190, n. 1 and 13303.

²⁸² *Notice*, 30 FCC Rcd at 3211-12, 3218, paras. 14-18, 34.

effective approaches to accomplish these objectives, and accordingly seek comment on potential costs and benefits associated with each proposal in the Further Notice.²⁸³

95. The nation's transition from legacy (i.e., TDM-based) communications platforms to IP for communications services has been steadily progressing since the last time the Commission expanded its outage reporting requirements to include "newly emerging forms of communication" in 2004.²⁸⁴ For one thing, consumers have significantly increased their dependence on broadband networks. A recent report found that 69 percent of Americans indicated that lacking a high-speed internet connection would be a major disadvantage to finding a job or accessing other health and employment-related information, and 40 percent said that lacking broadband is a major disadvantage for learning about, or accessing government services.²⁸⁵ It is clear that Americans look to broadband for access to vital information, as well as for services that require consistent, reliable broadband connections.²⁸⁶ Beyond consumer technologies, important sectors are relying increasingly on interconnected VoIP and broadband services.²⁸⁷ Indeed, in 2016, broadband service is a central part of most Americans' lives.²⁸⁸

96. Reliance by enterprise customers on dedicated services also continues to increase, reflecting the rapid transition of the nation's businesses and governmental institutions to broadband powered communications. As we recently observed in the *Special Access* proceedings, such services are "an important building block for creating private or virtual private networks across a wide geographic area and enabling the secure and reliable transfer of data between locations."²⁸⁹ They can also "provide

²⁸³ To that end, commenters should provide specific data and information, such as actual or estimated dollar figures, and include any supporting documents and descriptions of how any data was gathered and analyzed. Vague or unsupported assertions regarding costs or benefits, for example, generally will receive less weight and be less persuasive than more specific statements supported by real data.

²⁸⁴ *2004 Part 4 Order*, 19 FCC Rcd at 16840, para. 17.

²⁸⁵ John B. Horrigan and Maeve Duggan, *Home Broadband 2015: The Share of Americans with Broadband at Home Has Plateaued, and More Rely Only on Their Smartphones for Online Access* (Dec. 21, 2015), <http://www.pewinternet.org/2015/12/21/home-broadband-2015/>.

²⁸⁶ For instance, attending an online course would require quality audio and video streaming. *See e.g., 2015 Broadband Progress Report*, 30 FCC Rcd at 1438, at para 25. Likewise, 15 percent of American adults rely on broadband or other platforms to stream video content. *See* John B. Horrigan and Maeve Duggan, *Home Broadband 2015: The Share of Americans with Broadband at Home Has Plateaued, and More Rely Only on Their Smartphones for Online Access* (Dec. 21, 2015), <http://www.pewinternet.org/2015/12/21/home-broadband-2015/>.

²⁸⁷ *See, e.g.,* Financial Services Sector Coordinating Council Comments, PS Docket No. 11-82, at 2 (Sept. 23, 2011) (discussing that "recent events . . . reveal our dependence on telecommunications services and how disruptions can have significant impacts.").

²⁸⁸ *See generally, 2015 Broadband Progress Report*, Report and Notice of Inquiry, 30 FCC Rcd 1375, 1377, para. 2 (2015) (noting that "[t]oday, Americans turn to broadband Internet access service for every facet of daily life."); John B. Morris, Jr., Associate Administrator, Office of Policy Analysis and Development, National Telecommunications & Information Administration, "First Look: Internet Use in 2015," (March 21, 2016) <https://www.ntia.doc.gov/blog/2016/first-look-internet-use-2015> (stating "[s]eventy-five percent of Americans (ages 3 and older) used the Internet from any location in 2015, up from 71 percent in 2013.); U.S. Department of Commerce, National Telecommunications and Information Administration, *Exploring the Digital Nation: Embracing the Mobile Internet at i* (Oct. 2014), http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_embracing_the_mobile_internet_1016_2014.pdf (stating that the "adoption of mobile Internet is proceeding faster than earlier technologies, including the television," and "the use of mobile devices for communications and information access . . . is now deeply ingrained in the American way of life.").

²⁸⁹ *Business Data Services in an Internet Protocol Environment; Investigation of Certain Price Cap Local Exchange Carrier Business Data Services Tariff Pricing Plans; Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, WC Docket Nos. 16-143, 15-247, 05-25, RM-10593, Tariff Investigation Order

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dedicated access to the Internet and access to innovative broadband services.”²⁹⁰ They are used by mobile wireless providers to backhaul voice and data traffic from cell sites to their mobile telephone switching offices. Branch banks and gas stations use such connections for ATMs and credit card readers. Businesses, governmental institutions, hospitals and medical offices, and even schools and libraries use them to create their own private networks and to access other services such as Voice over IP (VoIP), Internet access, television, cloud-based hosting services, video conferencing, and secure remote access. Carriers buy them as a critical input for delivering their own customized, advanced service offerings to end users.²⁹¹ We believe it is critical that our outage reporting rules, long applicable to communications services such as special access, continue to provide an appropriate measure of network resiliency, reliability and security assurance for today’s and tomorrow’s broadband network services.

97. The Commission has long recognized the importance of these trends for outage reporting. In 2010, the *National Broadband Plan* called on the Commission to extend part 4 outage reporting rules to broadband Internet service providers and interconnected VoIP service providers, citing a “lack of data [that] limited our understanding of network operations and of how to prevent future outages.”²⁹² The following year, the Commission proposed to safeguard reliable 911 service by extending outage reporting rules to broadband Internet access service (BIAS) and backbone Internet service as well as interconnected VoIP service.²⁹³ In the *2012 Part 4 VoIP Order*, the Commission adopted rules to extend reporting requirements to interconnected VoIP service providers for outages resulting in a complete loss of service, but deferred action on the remaining proposals.²⁹⁴ At the time, the Commission indicated that its proposals to extend outage reporting obligations to broadband providers “deserve[d] further study.”²⁹⁵

98. Numerous commenters in this and other proceedings have urged the Commission to closely monitor changes in network reliability as 911 networks migrate to IP,²⁹⁶ and others assert that some communities are increasingly dependent upon robust mobile broadband connectivity to deliver, in

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and Further Notice of Proposed Rulemaking, DA 16-46554, para. 12 (rel. May 2, 2016) (*Business Data Services FNPRM*). The market for dedicated services is substantial and continues to grow. In 2013, for example, reported revenues for dedicated services reached \$45 billion. *See id.* at para. 7. As new uses for dedicated services continue to appear (e.g., through IoT growth, wireless evolution to 5G and beyond, PSAP ESINets, etc.), and new entrants, e.g., cable companies, continue to enter the market thereby enhancing dedicated services innovation and increasing competition for America’s enterprise communications purchasing dollars, we expect to see continued robust growth in this market.

²⁹⁰ *Id.* at para. 12.

²⁹¹ *Id.* at para. 12.

²⁹² Omnibus Broadband Initiative, Connecting America: The National Broadband Plan at Recommendation 16.6, Mar. 2010). *Proposed Extension of Part 4 of the Commission’s Rules Regarding Outage Reporting to Interconnected Voice Over Internet Protocol Service Providers and Broadband Internet Service Providers*, Notice of Proposed Rulemaking, 26 FCC Rcd 7166, 7173, para. 19, note 37 (2011) (*2011 Part 4 Notice*).

²⁹³ *2011 Part 4 Notice*, 26 FCC Rcd at 7167, 7170-71, 7182, paras. 2, 11, 34-35 (observing interconnected VoIP’s rapid emergence as a replacement for traditional voice telephony, including for 911 service, and the fact that 911 services were increasingly being delivered over broadband networks).

²⁹⁴ *2012 Part 4 Order*, 27 FCC Rcd at 2656, para. 9 (deferring on the proposal for a call degradation standard and the proposal to extend the obligations to broadband services).

²⁹⁵ *2012 Part 4 Order*, 27 FCC Rcd at 2656, para. 9.

²⁹⁶ NENA Comments, PS Docket No. 14-193 at 2 (Mar. 23, 2015) (“NENA has consistently urged the Commission to ensure that the evolving and diversifying nature of 9-1-1 service does not lead to a degradation of service reliability or a lack of public oversight.”); Washington Utilities and Transportation Commission Comments, PS Docket No. 14-193 at 2 (Mar. 17, 2015) (supporting “the Commission’s objective to preserve the ability of 911 callers to reach public safety resources despite marketplace and technological changes that are impacting the provision of 911 service”).

part, public safety services necessary for modern life.²⁹⁷ As federal funds are spent to ensure deployment of broadband, e.g., through programs such as the Connect America Fund,²⁹⁸ we expect recipients of these funds to build out networks that serve the public interest through reliable access to critical communications, e.g., 911.²⁹⁹ The U.S. Government Accountability Office (GAO) recognized that “[t]he communications sector is transitioning from legacy networks to an all-Internet Protocol (IP) environment, leading consumer and public safety groups, among others, to question how reliably the nation’s communications networks will function during times of crisis.”³⁰⁰ Echoing the Broadband Opportunity Council, in its 2015 report GAO questioned whether the Commission can currently fulfill its information needs through existing efforts to collect comprehensive, nationwide data on technology transitions, and recommended that we develop a strategy and gather information on the “IP transition to assess its potential effects on public safety and consumers.”³⁰¹ It also noted that this “would help [the Commission] address these areas of uncertainty as it oversees the IP transition,” and enable “data-driven decisions.”³⁰² We agree and seek comment below on mechanisms to improve the quantity and quality of data collected on the impact of increased broadband availability and usage.

99. In the fulfillment of its public safety responsibilities, no context is more important for the Commission to research and monitor the technology transition than in the deployment of IP-based Next Generation 911 (NG911) networks.³⁰³ NENA’s i3 architecture has become the *de facto* standard for NG911 network design, in which voice, text, and data communications to, from, and between PSAPs

²⁹⁷ Competitive Carriers Association Reply, GN Docket No. 14-126, at 5 (April 6, 2015).

²⁹⁸ The Connect America Fund (CAF) Phase II awarded 10 telecommunications carriers with \$1.5 billion in annual support for rural broadband deployment. Press Release, FCC, Carriers Accept Over \$1.5 Billion in Annual Support from Connect America Fund to Expand and Support Broadband for Nearly 7.3 Million Rural Consumers in 45 States and One Territory (Aug. 27, 2015), http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0827/DOC-335082A1.pdf. Carriers receiving Connect America Fund Phase II support must build out broadband to 40 percent of funded locations by the end 2017, 60 percent by the end of 2018, 80 percent by the end of 2019, and 100 percent by the end of 2020. *Id.*

²⁹⁹ As one commenter observed with respect to rural broadband experiments, “[s]urely the Commission does not want to fund broadband-capable networks over which consumers cannot place 911 calls during bad weather incidents or other emergencies, or on which voice quality is otherwise so lacking that public safety is at risk.” Letter from Michael R. Romano, Senior Vice President, NTCA–The Rural Broadband Association, to WC Docket No. 10-90, at 6-7 (July 23, 2015) (NTCA *Ex Parte*).

³⁰⁰ Government Accountability Office, Report to Congressional Requesters: Internet Protocol Transition, FCC Should Strengthen Its Data Collection Efforts to Assess the Transition’s Effects, GAO-16-167, at 1 (2015), <http://www.gao.gov/assets/680/674231.pdf> (GAO 2015 Data Collection Efforts Report).

³⁰¹ GAO 2015 Data Collection Efforts Report at 28-29. In response to the GAO report, the Commission highlighted its existing efforts to collect data on the IP transition and its plans to enhance those methods going forward. GAO 2015 Data Collection Efforts Report at 40-45, Appendix II: Comments from the Federal Communications Commission.

³⁰² GAO 2015 Data Collection Efforts Report at 29.

³⁰³ NG911 networks will eventually allow users to make not only traditional voice 911 calls but also transmit text, photos, videos, and data to 911 call-centers nationwide. See FCC, Legal and Regulatory Framework for Next Generation 911 Services: Report to Congress and Recommendations Pursuant to the Next Generation 911 Advancement Act of 2012, at 3 (2013), https://apps.fcc.gov/edocs_public/attachmatch/DOC-319165A1.pdf (NG911 Report to Congress). NG911 will allow 911 call-takers and emergency first responders to “transfer calls, messages, and data between any PSAPs on any interconnected [NG911] system anywhere in the country (and beyond),” and to “access a wide range of supportive databases and share new and more robust forms of data to facilitate call processing, emergency response and comprehensive incident management.” National Emergency Number Association (NENA), NG9-1-1 Project, http://www.nena.org/?NG911_Project (last visited Aug. 31, 2015).

operate over an Emergency Services IP network (ESINet).³⁰⁴ The Commission has observed that “new capabilities will enhance the accessibility of 911 to the public (e.g., by enabling video and text-to-911 for persons with speech and hearing disabilities), and will provide PSAPs with enhanced information that will enable emergency responders to assess and respond to emergencies more quickly.”³⁰⁵ Service providers typically market such improvements to 911 as a way to offer better service at lower cost and an opportunity to phase out obsolete technologies.³⁰⁶

100. Nevertheless, we acknowledge that “evolving technology, while providing many benefits to PSAPs and the public, also has introduced new and different risks.”³⁰⁷ For example, 911 service can now be disrupted by software malfunctions, database failures, and errors in conversion from legacy to IP-based network protocols, and such disruptions can occur in unique parts of the IP network that lack analogous counterparts in legacy architecture. Moreover, the consolidation of critical resources in a small number of databases increases the risk of a 911 service failure that affects many PSAPs at once, even across state lines or potentially impacting all of a service provider’s customers nationwide.³⁰⁸ Given the growing deployment of ESINets and the Commission’s specific interest in monitoring the reliability and resiliency of PSAP connectivity, we believe that it is critical for the Commission to have visibility into the networks of all providers supporting ESINet service and other critical infrastructure to fully understand reliability and resiliency factors associated with public safety and critical infrastructure communications.

101. For both emergency and non-emergency services, broadband is now (or rapidly is becoming) the communications sector’s essential transmission technology and, thus, “an integral component of the U.S. economy, underlying the operations of all businesses, public safety organizations, and government.”³⁰⁹ These communications sector developments, both in NG911 deployment and in the

³⁰⁴ See NENA Master Glossary of 9-1-1 Terminology (July 29, 2014), https://c.yimcdn.com/sites/www.nena.org/resource/resmgr/Standards/NENA-ADM-000.18-2014_2014072.pdf (defining “ESINet” as “a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the transport infrastructure upon which independent application platforms and core functional processes can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESINets may be constructed from a mix of dedicated and shared facilities. ESINets may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks)”).

³⁰⁵ *NG911 Report to Congress* at 3. See also Lupinacci, Jeff, “ESINets Are a Game Changer for Public Safety and the First Step to Next-Gen 911,” *Emergency Management Magazine* (May 6, 2015), <http://www.emergencymgmt.com/next-gen-911/ESINets-Are-a-Game-Changer-for-Public-Safety.html>.

³⁰⁶ Intrado, for example, states that NG911 “will significantly expand public safety capabilities and bring enhanced value to an increasing number of stakeholders,” and that IP-based call handling “offers PSAPs significant advantages in terms of efficiency within the communication center, redundancy, interoperability and fast, easy call transfer that includes data.” Intrado, Inc., *Next-Generation 9-1-1: The Essential Guide to Getting Started*, Volume One at 3, 27 (2013), <https://www.intrado.com/sites/default/files/documents/NextGen%209-1-1%20The%20Essential%20Guide%20to%20Getting%20Started.pdf>. Intrado also notes that “[s]ome PSAPs have begun to transition to an IP-based infrastructure, but the majority are still using the 50-year-old analog CAMA trunk technology.” See *id.* at 18, 25.

³⁰⁷ *911 Governance Notice*, 29 FCC Rcd 14208, 14217, para. 20 (2014).

³⁰⁸ For example, in April 2014, a software coding error at a Colorado-based SSP’s 911 call routing facility led to a loss of 911 service to a population of more than 11 million in seven states –California, Florida, Minnesota, North Carolina, Pennsylvania, South Carolina, and Washington – for up to six hours. See FCC, April 2014 Multistate 911 Outage: Cause and Impact, Case File Nos. 14-CCR-0001-0007 (PSHSB 2014), <http://www.fcc.gov/document/april-2014-multistate-911-outage-report> (*Multistate Report*).

³⁰⁹ U.S. Department of Homeland Security, “Critical Infrastructure Sectors—Communications Sector,” <http://www.dhs.gov/communications-sector> (last visited May 25, 2016).

nation's communications sector more broadly, illustrate how important it is that the Commission's outage reporting requirements evolve at a similar pace as the communications sector. As 911 services evolve toward NG911 combinations of voice, data, and video, and as voice and data are exchanged over the same infrastructure, it is necessary for the Commission to refocus its lens for outage reporting and re-examine its part 4 reporting metrics to ensure that they collect the necessary data on the reliability of *broadband* networks. Access to such objective information would ensure that the evolution of critical communications services does not pose an obstacle to the Commission's established consumer protection, public safety, and national security statutory missions.

B. Broadband Network Outage Reporting

1. The Need for Updated Broadband Network Disruption and Outage Reporting

102. Broadband networks now provide an expanding portion of today's emergency and non-emergency communications and have technological flexibility that allows service providers to offer both old and new services over a single architecture. We observe that broadband networks come with their own advantages and challenges; particularly, outages and service disruptions can occur at both at the physical infrastructure and the service levels.³¹⁰ Broadband networks are just as vulnerable to physical outages and service disruptions as the public-switched telephone network (PSTN), but are also susceptible to attacks at the application layer, which may not affect the underlying physical infrastructure.³¹¹ We seek comment on these observations as they relate to our proposed broadband outage reporting requirements.

103. We further observe that broadband networks' interrelated architectural makeup renders them more susceptible to large-scale service outages. Growing reliance on remote servers and software-defined control has increased the scale of outages, as compared to those in the legacy circuit switched-environment. Through news accounts, we have observed recent outage events impacting customers across several states.³¹² Moreover, broadband networks' architectural efficiencies can actually magnify the impact of customer service-affecting outages that do occur.³¹³ For example, "sunny day" outages –

³¹⁰ We recognize that network outage or service disruptions at the application level in which various services are provided (e.g., streaming video, video conferencing) have different performance and network management requirements than those at the physical network infrastructure level. See ITU-T Y.1541 Series Y: Global Information Infrastructure, Internet Protocol Aspects and Next-Generation Networks at <https://www.itu.int/rec/T-REC-Y.1541-201112-I/en>.

³¹¹ For example, in August of 2014, Time Warner Cable experienced a network outage, that impacted the Domain Name System (DNS), an application layer protocol, and resulted in customers not being able to reach the Internet. See Baumgartner, Jeff, "TWC Blames Internet Outage On Backbone 'Issue'", MultiChannel News (Aug. 27, 2014), <http://www.multichannel.com/news/broadband/twc-blames-internet-outage-internet-backbone-issue/383404>. There was no indication that physical infrastructure was impacted during this event, possibly suggesting that broadband networks may have self-healing aspects that enable providers to isolate disruptions and, in turn, avoid or minimize end user impact. We seek comment on these observations.

³¹² For example, Time Warner Cable's 2014 outage disrupted service for millions of broadband customers across the United States for several hours. See, e.g., Reisinger, Don, "Time Warner Cable suffers massive outage nationwide," CNET (Aug. 27, 2014), <http://www.cnet.com/news/time-warner-cable-suffers-massive-outage-nationwide/> ("An outage as widespread as this one underscores the pervasiveness of the Internet and the need for a quick resolution to any disruption in service."). An outage of similar length blocked Internet access for Comcast subscribers in California and Washington on June 2, 2015. See Risley, James, "Comcast says outage resulted from overloaded DNS servers, offers credit to those affected," GeekWire (June 2, 2015), <http://www.geekwire.com/2015/comcast-outage-resulted-from-overloaded-dns-servers-offers-credit-to-those-affected/>.

³¹³ NYPSC 2011 Comments at 5 (noting that staff "has observed numerous outages in IP networks . . . that often [result] in a more severe impact on customers than a similarly caused failure over the legacy circuit PSTN."). NYPSC says that such outages have occurred "due to single points of failure at a centralized call processing or critical signaling facility, or a damaged fiber cable carrying concentrated traffic." *Id.*

caused by technical issues rather than by environmental ones – have been shown to jeopardize 911 communications services, sometimes across several states.³¹⁴ Indeed, broadband networks can support centralized services, but, if not engineered well, they can harm resiliency objectives. We believe that these challenges will likely become more pronounced as broadband increasingly comes to define the nation’s communication networks. This new paradigm of larger, more impactful outages suggests that there would be significant value in collecting data on outages and disruptions to commercial broadband service providers. We seek comment on this view.

104. Given the potential for broad-scale, highly-disruptive outages in the broadband environment – and particularly those impacting 911 service – the adoption of updated broadband reporting requirements would likely provide the Commission with more consistent and reliable data on critical communications outages and enable it to perform its mission more effectively in light of evolving technologies and service offerings. Over the past decade, review and analysis of outage reports have enabled the Commission to facilitate and promote systemic improvements to reliability, both through industry outreach, the CSRIC, and formal policy initiatives.³¹⁵ The analysis of trends identified from our authoritative outage report repository has proven to be a useful tool for the Commission in working with providers to address outages and facilitate sector-wide improvements.³¹⁶ As NG911 functionality becomes centralized within broadband networks, network vulnerabilities specific to emergency services will emerge, and the Commission should be well-informed of such vulnerabilities. We seek comment on this position.

a. Mandatory vs. Voluntary Reporting

105. In the *2011 Part 4 Notice*, the Commission asked whether and how outage reporting should to be extended to broadband.³¹⁷ At the time numerous commenters challenged the idea, with some suggesting that mandatory outage reporting is not suitable for broadband packet-switched networks given built in redundancies, and the complexity of tracing disruptions to a single cause.³¹⁸ CenturyLink, for example, stated that the “notion of a single ISP being responsible for the delivery of an Internet communication from the source of the communication to the destination host is unreasonable and not

³¹⁴ *Multistate Report* at 1; *911 Governance Notice*, 29 FCC Rcd at 14222, para. 32; Engebretson, Joan, “FCC: TDM-to-IP Transition Was a Cause of 911 Outage Affecting Seven States,” *Telecompetitor* (Oct. 17, 2014), <http://www.telecompetitor.com/fcc-tdm-ip-transition-cause-911-outage-affecting-seven-states/>.

³¹⁵ See, e.g., *Improving 911 Reliability; Reliability and Continuity of Communications Networks, Including Broadband Technologies*, Report and Order, 28 FCC Rcd 17476, 17496, para. 57 (2013) (observing that “many service providers have realized significant improvements in network reliability through . . . thorough and consistent implementation” of CSRIC best practices); ATIS Network Reliability Steering Committee, 2010-2012 Operational Report at 6-15 (July 2013) <https://www.atis.org/docstore/product.aspx?id=28010> (noting that “[t]he continued efforts of [CSRIC] member companies have directly and positively impacted the resiliency and reliability of the nation’s networks, which ultimately benefits all users”).

³¹⁶ For instance, in 2008, there was a marked reduction in wireline outages following a Commission intervention. See *2011 Part 4 Notice*, 26 FCC Rcd at 7172, para. 16 (“estimated lost 9-1-1 calls due to wireline outages were reduced by more than 50 percent when the Commission worked with the Network Reliability Steering Committee (NRSC) to reduce wireline outages.”). ATIS claims the reduction results from collaboration among industry members participating in the ATIS Network Reliability Steering Council (NRSC), but we note that NRSC initiated work on reducing wireline outages only after it saw a Commission analysis of outage data that indicated the nature, scope and severity of the problem. The Commission would not have been in a position to provide this input and guidance to the industry without access to the outage data it receives under Part 4. In this case, the Commission’s outage reporting program served as a uniquely effective precipitating force for improving network reliability. See, e.g., *2012 Part 4 Order*, 27 FCC Rcd at 2661-64, paras. 25-31. See also NRSC Annual Report 2004 (Oct. 2005), http://www.atis.org/NRSC/Docs/2004_Annual_Report.pdf.

³¹⁷ *2011 Part 4 Notice*, 26 FCC Rcd at 7181-86, paras. 31-50.

³¹⁸ NCTA 2011 Comments at 5; US Telecom 2011 Comments at 7; Verizon 2011 Comments at 14.

technically feasible,” and that gathering performance metrics from end-users’ broadband access lines is not a useful or scalable way to obtain information about outages.³¹⁹ T-Mobile likewise argued against mandatory reporting, and suggested that the Commission’s experience with DIRS demonstrates the effectiveness of voluntary system for outages, should the Commission determine that voluntary reporting would be an appropriate course of action.³²⁰

106. Where the Commission has required mandatory reporting of disruptions to IP communications (such as interconnected VoIP communications),³²¹ we have found substantial value from that reporting. We believe that the same is true for other IP-based networks and services that have become such a typical feature of our communications networks. Additionally, in the *2012 Part 4 Order*, the Commission observed that “the record . . . reflect[ed] a willingness on the part of broadband Internet service providers to participate in a voluntary process” to improve the Commission’s awareness of broadband outages and their impact on public safety.³²² Over the past four years, broadband providers have not come forward with concrete proposals for such a process or even expressed such an interest in voluntary reporting. As with previous attempts at voluntary reporting, we are concerned that any voluntary regime for broadband outages would be unsuccessful in achieving a level of participation necessary to make the program effective.³²³ We seek comment on this position, and how to apply the lessons learned from our previous voluntary outage reporting regime. Finally, as the Commission observed in 2011, “even if incentives did motivate individual market participants to optimize their own reliability, they do not necessarily optimize systemic reliability.”³²⁴ We believe that mandatory reporting of broadband network outages would motivate such optimization, and, thus, would advance the public interest. We seek comment on this view.

107. For the reasons set out above, we reaffirm our belief that mandatory reporting requirements would have a positive effect on the reliability and resiliency of broadband networks. Therefore, we tentatively conclude that broadband network outage reporting should be mandatory. We seek comment on this tentative conclusion and seek further comment on the issues first raised generally in the *2011 Part 4 Notice*.

2. Proposed Coverage of Broadband Outages.

108. In proposing updated broadband outage reporting rules, we must identify the appropriate set of broadband – and broadband-constituent – services, facilities, and infrastructure that are reasonably

³¹⁹ CenturyLink 2011 Comments at 10.

³²⁰ T-Mobile 2011 Comments at 2.

³²¹ 47 CFR §§ 4.3(h), 4.9(g).

³²² *2012 Part 4 Order*, 27 FCC Rcd at 2694, para. 114 (ATIS Comments at 16 (observing that a voluntary reporting program would be flexible and collaborative); AT&T Comments at 17-18 (stating that a voluntary program would better allow the Commission to ascertain what actual reliability issues may exist); CenturyLink Comments at 20-21 (engaging affected broadband ISPs in a collaborative effort to determine relevant metrics and thresholds for defining ISP network outages will yield more productive results); Sprint Comments at 3 (establishing a voluntary pilot program is preferable to mandatory reporting); T-Mobile Comments at 10 (positing that voluntary reporting based on metrics developed by industry groups and standards bodies provides the necessary flexibility to obtain outage information best suited to emerging technologies); TIA Comments at 5 (noting that intra- and inter-industry voluntary efforts are already currently underway that adequately address reliability and resiliency concerns, including best practices, standards, and public-private efforts) (footnote omitted); Verizon Comments at 8 (noting that to the extent the Commission may require additional data on broadband reliability to perform its statutory obligations, the Commission could promote the industry’s establishment of a voluntary IP outage reporting program).

³²³ See, e.g., *2004 Part 4 Order*, 19 FCC Rcd at 16851, para. 37 (describing the Industry-Led Outage Reporting Initiative).

³²⁴ *2011 Part 4 Notice*, 26 FCC Rcd at 7174, para. 20.

appropriate for reporting requirements. In the *2015 Open Internet Order*, we described the broadband communications environment to include a number of different market segments and services, including arrangements underlying those services. Among other things, we drew a distinction between networks and services deploying broadband capabilities provided to consumers, those deploying such capabilities to businesses and other enterprises, and those providing Internet backbone services. And we specifically excluded from broadband Internet access service (BIAS) enterprise service offerings such as “special access services” and their functional equivalents and other non-BIAS services.³²⁵

109. In the *Business Data Services/Special Access NPRM*, including its adjunct *2015 Data Collection*, we further described the “special access” or “dedicated services” that form critical portions of the broadband ecosystem, i.e., – links that “enabl[e] secure and reliable transfer of data between locations.”³²⁶ Although such services are already addressed in part 4 to some extent, which as noted above broadly defines those “communications services” subject to these rules,³²⁷ our part 4 reporting standards do not ensure that outage reporting illuminates broadband issues critical to functionality of these services.³²⁸ We believe that the public safety goals to be accomplished through Part 4 assurance for today’s broadband communications world can best be advanced if we extend the scope of our rules to BIAS, for the first time, and update and clarify those requirements for dedicated services so that we receive broadband-specific outage information for those services, and that we ensure our requirements apply equally and neutrally regardless of technology or provider type. We seek comment on this view.

110. For broadband outage reporting purposes, we believe developing reporting metrics that clearly address this functionality to be critical to our continued ability to obtain situational awareness with respect to reliability of the Nation’s most important communications services. For the reasons set forth below, we tentatively conclude that the public safety goals to be accomplished through Part 4 assurance for today’s broadband communications world can most reasonably be advanced by extending those rules to cover BIAS, and by updating those requirements for measuring the reliability of dedicated services. In our view, these steps are likely to provide us with most if not all of the information reasonably necessary for purposes of our Part 4 mission, while avoiding the need to subject other service providers (such as Internet backbone providers) to these reporting requirements. Our proposal will also ensure that our requirements apply equally and neutrally regardless of technology or provider type. We seek comment on these views. By taking the actions now proposed, we believe we will have the ability to ensure greater broadband network reliability, resiliency, and security. We believe, thus, that this approach would ensure comprehensive outage reporting that, for BIAS and dedicated services, would encompass: (i) all customer market segments to include – mass market, small business, medium size business, specific access services, and enterprise-class (including PSAPs, governmental purchasers, carriers, critical infrastructure industries, large academic institutional users, etc.); (ii) all providers of such services on a

³²⁵ E.g., Internet access, interconnection, backbone service, traffic exchange, non-BIAS data services, etc. See *Protecting and Promoting the Open Internet*, GN Docket No. 14-28, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd 5601, 5609-11, 5682-99, paras. 25-35, 186-213 (2015) (*2015 Open Internet Order*). *Preserving the Open Internet*, Report and Order, 25 FCC Rcd 17905, 17932-33, 17935, paras. 44,45, 51 (2010) (*2010 Open Internet Order*), *aff’d in part, vacated and remanded in part sub nom. Verizon v. FCC*, 740 F.3d 623 (D.C. Cir. 2014).

³²⁶ *Business Data Services FNPRM*, FCC 16-54 at para. 12.

³²⁷ See *supra* Section V.A.

³²⁸ See *2004 Part 4 Order*, 19 FCC Rcd at 16835-36, paras. 7-8, notes 7 and 8. As the Commission observed in its discussion of DS3 (i.e., special access circuit) metrics, “DS3 is a communications highway that has been put in place to carry traffic in a digital format. That traffic can range, for example, from simple alarm and control circuits, to voice circuits, to radio and television programs, to circuits carrying ATM or credit card transactions, to FAA flight control circuits, to Department of Defense circuits, to circuits transferring billions of dollars from one Federal Reserve Bank to another, and to circuits critical to the operation of the stock and bond markets.”

technology neutral basis; and (iii) all purchasers (end users) of those services without limitation. We seek comment on this view.

a. Broadband Internet Access Service (BIAS)

111. The Commission defines BIAS as:

[a] mass-market retail service by wire or radio that provides the capability to transmit data to and receive data from all or substantially all Internet endpoints, including any capabilities that are incidental to and enable the operation of the communications service, but excluding dial-up Internet access service. This term also encompasses any service that the Commission finds to be providing a functional equivalent of the service described in the previous sentence³²⁹

Some NG911 systems use BIAS to support critical functions like transmission of location information, making it of particular interest to the Commission as NG911 is rolled out. BIAS is also increasingly integral for everyday life; according to the Commission’s latest broadband subscribership data, over 250,000,000 Americans purchase wireline or wireless (or both, typically) BIAS to meet an ever-expanding array of their communications needs.³³⁰ These services are essential for work, family and community activities, social engagements and leisure, and are increasingly vital for emergency services communications whether as voice, texting or other data transmission.³³¹ Given BIAS’ ubiquitous penetration throughout the American landscape and the multiple important emergency and non-emergency uses for which Americans consume BIAS, we recognize the same, if not higher, need for assurance through outage reporting under part 4 as we have long recognized for other communications services. We seek comment on this understanding and approach.

112. Existing part 4 rules define relevant providers to include “affiliated and non-affiliated entities that maintain or provide communications networks or services used by the provider,” and require reporting of “all pertinent information on the outage.”³³² We seek specific comment on whether BIAS providers could be used as a central reporting point for all broadband network outages, i.e., whether our part 4 assurance goals for broadband outage reporting can be effectuated through, or should be limited to, an approach in which only BIAS providers (as opposed to other entities providing networks or services) would be required to report. We ask commenters to address BIAS providers’ services relationships with other providers (i.e., entities that provide IP transport underlying the BIAS offering), and particularly whether, and the extent to which they share information (formally or informally) relevant to outage

³²⁹ 47 C.F.R. § 8.2(a); *see also* 2015 *Open Internet Order*, 30 FCC Rcd at 5609-10, 5682-84, paras. 25-26, 187-189. BIAS includes those services offered over facilities leased or owned, wireless or wireline, to residences and individuals, small businesses, certain schools and libraries and rural health entities. *See id.* at 5682-84, paras. 187-89. BIAS does not include enterprise service offerings, which are typically offered to larger organizations through customized or individually-negotiated arrangements, or special access (“dedicated”) services. *See id.* at 5745-46, note 879.

³³⁰ FCC, *Internet Access Services: Status as of December 31, 2014* at 16 (2016), http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0330/DOC-338630A1.pdf.

³³¹ *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, GN Docket No. 15-191, 2016 Broadband Progress Report, (rel. Jan. 29, 2016). Based on the current widespread use of mobile broadband for communications, information access, location based services, and social media and business networking, as well as emerging trends and the clear prospect of future innovation, mobile broadband is now an important component of advanced telecommunications services and will play an increasingly important role in the future.” *See id.* at para 21. Americans, including those who do not have broadband, increasingly view an at-home, high-speed broadband connection as a critical communications tool.” *See id.* at para 40.

³³² 47 C.F.R. §§ 4.3(a), 4.3(d), 4.3(e), 4.3(f), 4.3(g), 4.3(h), 4.11.

reporting. Do providers typically discuss or notify each other in the event of disruptions? Do or can BIAS providers enter into service level or other agreements that contain requirements that enable them to obtain adequate information concerning the source of outages that originate with such other providers? Should our rules impose an obligation on BIAS providers to provide such information in their part 4 reports?

113. In what way is the Commission’s experience with entities that “maintain or provide communications networks or services used by the provider” (e.g., for legacy voice communications or interconnected VoIP service) instructive in its consideration of these issues associated with BIAS outage reporting? Or, are there sufficient technical or operational differences between BIAS and entities already covered by part 4 as to warrant a new approach? If so, what are those differences and how should the Commission approach BIAS outage reporting to address those differences in ways that promote effective outage reporting? What actions could the Commission take to ensure that BIAS providers can obtain sufficient information in the event of a service outage about the source and cause of the outage? We also seek comment on whether a BIAS-only approach would sufficiently capture critical communications, i.e., communications involving critical infrastructure, needed for NS/EP, or otherwise associated with public safety or emergency preparedness. If it does not, should the Commission extend its reporting requirements directly to other entities that maintain or provide communications networks or services used by the BIAS provider?

b. Dedicated Services

114. In our *Dedicated Services/Special Access* proceeding, we have closely examined the evolving (in terms of scope, array and use of services) and expanding (in terms of participants, including new entrants) market for IP- and other data protocol-based packet services to enterprises and other segments and purchasers not included within the mass market level served by BIAS providers. These dedicated services power the fullest range of large data pipe (high capacity) services, e.g., circuit-based TDM facilities like DS3s,³³³ or data network transmission (packet-based) facilities such as “Ethernet”, and are deployed without geographic restraint (i.e., in use for “last mile”, “middle mile”, “long haul”, etc.). In the past, our rules and reporting emphasis under part 4 have been framed mostly by reference to legacy TDM special access circuits, which is certainly a segment of the services and infrastructure properly classified as “dedicated services.” In this Further Notice, we now place clearer emphasis on broadband outages through new proposed metrics, thresholds and triggers, and also take steps to ensure all dedicated services providers – old and new – understand their compliance obligations under our rules.

115. To achieve this clarity and emphasis, we first seek comment on the following definition of “dedicated services” for outage reporting purposes:

Services that transport data between two or more designated points, e.g., between an end user’s premises and a point-of-presence, between the central office of a local exchange carrier (LEC) and a point-of-presence, or between two end user premises, at a rate of at least 1.5 Mbps in both directions (upstream/downstream) with prescribed performance requirements that include bandwidth, latency, or error-rate guarantees or other parameters that define delivery under a Tariff or in a service-level agreement.³³⁴

³³³ Although DS3s and DS1s, both of which are longstanding dedicated services “warhorses”, have always been subject to outage reporting (as have other “two-way voice and/or data communications”, 47 C.F.R. § 4.3(b)), our reporting rules may provide insufficient clarity as to *non-TDM* dedicated services such as “Ethernet.” We seek to provide both broadband-specific reporting emphasis and scope of covered services clarity in this Further Notice.

³³⁴ *Business Data Services FNPRM*, FCC 16-54 at para. 279; *Special Access Data Collection Implementation Order* ___ FCC Red at 13303.

In addition to commenting on this proposed definition for part 4's purposes, we ask commenters whether there are any other descriptors needed to ensure both the clarity and breadth of the services that should be included within dedicated services for part 4 reporting assurance purposes.

116. Dedicated services are important components for creating private or virtual private networks across a wide geographic area, and for enabling the secure and reliable transfer of data between locations, including the provision of dedicated Internet access and access to innovative broadband services.³³⁵ Dedicated services, however,

[are] distinctly different from the mass marketed, "best efforts" [BIAS] provided to residential end users, such as AT&T's U-verse or Comcast's XFINITY. Dedicated services typically provide dedicated symmetrical transmission speeds with performance guarantees, such as guarantees for traffic prioritization, guarantees against certain levels of frame latency, loss, and jitter to support real-time IP telephony and video applications, or guarantees on service availability and resolving outages. As such, dedicated services tends to cost substantially more than "best efforts" services and are offered to businesses, non-profits, and government institutions who need to support mission critical applications and have greater demands for symmetrical bandwidth, increased reliability, security, and service to more than one location.³³⁶

117. As with BIAS, we seek comment on the extent to which those who provide dedicated services are in a position to inform the Commission of the source and cause of reportable outages. We believe that such providers are reasonably likely to be well-informed about these questions. Dedicated services providers also provision service "solutions" for other communications providers; for example, mobile providers use dedicated services to backhaul voice and data traffic.³³⁷

118. With respect to negotiated terms and conditions for assurance, is it standard industry practice to inform dedicated services customers about the nature of any particular outage or performance issue that triggers assurance guarantees (i.e., credits)? Does this also extend to inform such customers about any non-service impacting outages, regardless of the seriousness of the outages, or to inform customers as to the provider's overall performance using an established set of metrics? For example, are dedicated service customers interested in non-service impacting outages whose notification helps inform resiliency decisions or helps inform predictive risk mitigation actions based on a larger data set of observed failure modes? If so, how are such customer needs addressed through contract negotiations or, post-contract, through course of dealing between parties or by other means (e.g., Industry Data Breach Annual Summaries, academic research, etc.)?

119. We recognize that variation between and among dedicated services providers, the services they provide, their customers' service needs and profiles, and other factors may indicate differences that we should consider with respect to the benefits and burdens of dedicated services outage reporting. Accordingly, we seek comment on such differences, and particularly their impact on relative costs and burdens for outage reporting.

120. In sum, to ensure the Commission can effectively discharge its public safety mandates and mission with respect to the communications networks and services upon which America's citizens, businesses and governmental organizations rely, we propose that BIAS providers be required to report outages pursuant to the Commission's part 4 rules, and we propose to update existing outage reporting metrics to reflect broadband disruptions involving dedicated services and provide clarity as to scope of covered services. We recognize that this approach may not capture the full scope of communications services, but we believe, at this time, that the costs of extending our outage reporting requirements beyond these services may exceed the benefits. We seek comment on this view. To the extent

³³⁵ *Business Data Services FNPRM* at para. 12; *Dedicated Services NPRM* at para. 13.

³³⁶ *Id.*

³³⁷ *Dedicated Services NPRM* at para. 72.

commenters believe that there are other communications providers that provide broadband-related services warranting part 4 outage reporting, we invite commenters to elaborate in detail.

3. Proposed Reporting Process for Broadband Providers

121. *Three-part submission process.* We seek comment on whether to apply the three-part structure used by other reporting entities under part 4 to covered broadband service providers. This process would require the provider to file a notification to the Commission within 120 minutes of discovering a reportable outage as further defined herein;³³⁸ an initial report within 72 hours of discovery of the reportable outage; and a final report within 30 days of discovering the outage.³³⁹ Covered providers would submit all reports electronically to the Commission and include all of the information required by section 4.11 of the Commission's rules.³⁴⁰ A notification would include: the name of the reporting entity; the date and time of the onset of the outage; a brief description of the problem, including root cause information and whether there were any failures of critical network elements, if known; service effects; the geographic area affected by the outage and a contact name and telephone number for the Commission's technical staff.³⁴¹ The initial reports would include the same information, and in addition, any other pertinent information then available on the outage, as submitted in good faith.³⁴² Further, the provider's final report would include all other pertinent information available on the outage, including root cause information where available and anything that was not contained in or changed from the initial report.³⁴³

122. *Reporting requirements concerning critical network elements.* Pursuant to the requirements of Section 4.11 of our rules, once an outage triggers a reporting requirement, there is certain information that we expect providers, acting in good faith, to include in their reports to the extent such matters are at issue in a given reportable event and the provider, through the exercise of reasonable due diligence, knows or should know the facts. We believe our concept of reportable outages must evolve as new events threaten the reliability and resiliency of communications in ways that can expose end users to serious risks, to that end we routinely update the NORS data fields to reflect changes in technology and seek to do so here. Specifically, we expect providers to include information in their reports concerning (1) the failure of facilities that might be considered critical network elements, and (2) unintended changes to software or firmware or unintended modifications to a database to the extent relevant to a given outage or service disruption that is otherwise reportable.³⁴⁴ We seek comment on this approach.

³³⁸ An outage would be deemed "reportable" if it meets any of the criteria discussed *supra* in Section V.B.4.

³³⁹ 47 CFR § 4.9(a), (c)-(f) (describing the reporting process for cable, satellite, SS7, wireless, and wireline providers).

³⁴⁰ 47 CFR § 4.11. Providers must submit notifications and reports in good faith, where the person submitting the final report is "authorized to legally bind the provider to the *truth, completeness, and accuracy of the information* contained in the report," and attests that "on oath deposes and states that the information contained therein is *true, correct, and accurate to the best of his/her knowledge and belief* and that the *communications provider* on oath deposes and states that this information is *true, complete, and accurate.*" 47 C.F.R. § 4.11 (emphasis added).

³⁴¹ 47 CFR § 4.11. We note that this notification requirement is distinct from a covered 911 service provider's obligation to notify PSAPs in the event of an outage impacting 911 service. *See* 47 CFR § 4.9(h). We defer discussion of those notification requirements to PS Docket Nos. 13-75 and 14-193.

³⁴² 47 CFR § 4.11.

³⁴³ 47 CFR § 4.11.

³⁴⁴ *See supra* Section V.B.1. As discussed above, broadband networks are susceptible to attacks at higher layers in the protocol stack than would apply to legacy TDM communications. Such events may not affect the underlying physical infrastructure at all, but nonetheless cause reportable service disruptions as we define them here. We wish to ensure that reporting of broadband outages contains this information as part of presenting the full picture of the reportable disruption nor outage under part 4, as we believe it would be necessary to provide us with the level of data granularity we would need to understand reported outages and to consider appropriate actions (further

(continued....)

123. We propose to consider a network element “critical” if its failure would result in the loss of any user functionality that a covered broadband provider’s service provides to its end users.³⁴⁵ And, we believe that information concerning such failures uniquely provides a sharper network and service vulnerability focus that would further the Commission’s public safety and related missions by enhancing the Commission’s situational awareness and network operating status awareness. We seek comment on this assessment. We seek comment on these views and on this reporting approach. Additionally, we propose that to the extent unintended changes to software or firmware or unintended modifications to a database are revealed as part of reportable disruptions, we should be apprised of those facts through the outage reports providers submit.³⁴⁶

124. As with events involving critical network element failure, we propose to modify the NORS interface to support information regarding outages and disruptions that are associated with unintended changes to software or firmware or unintended modifications to a database. This is consistent with our customary practice of updating NORS information fields as technologies and services evolve. Thus, if unintended changes to software or firmware or unintended modifications to a database played a role in causing an otherwise reportable outage, we would expect providers’ reports to include specific detail about the nature of the associated facts. The Commission seeks comment on what information would be useful to understand these exploitations. Would it be helpful for us to use open fields so that outages can be described in terms defined by the provider acknowledging that these may differ from provider to provider? We seek comment on this approach. We recognize that unintended changes to software and firmware and unintended modifications to a database may not always manifest themselves in the form of reportable communications “outages” as traditionally defined by the Commission or as we propose for broadband outage reporting. Are there additional data drop-down menu fields we should consider beyond those proposed above that would provide significant information about broadband outages? Would it be useful to establish pre-defined elements in the reporting metrics that would provide the Commission with more consistent failure information that would improve long-term analysis about unintended changes to software and firmware or unintended modifications to a database that would not otherwise be reported to the Commission? For example should the Commission receive information on distributed denial of service (DDoS) attacks in order to support an improved correlation should multiple outages involve DDoS as a contributing factor?

125. Should we expand our definition of Part 4 outages to include failures that are software-related or firmware-induced, or unintended modifications to a database that otherwise do not trigger hard-down outages or performance degradations as described below? For example, should a route hijacking that diverts packets to another country, but still delivers the packets to the consumer be a reportable outage? If so, we seek comment on this position. What process should be followed to make the Commission aware of such disruptions? Would such a requirement be unnecessary were the Commission to adopt proposed data breach reporting requirement proposed in the *Broadband Privacy Notice of Proposed Rulemaking*?³⁴⁷

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monitoring, potential referral for standards or best practices development, crisis management assistance, emergency response coordination or future preparedness, etc.). We seek comment on this approach.

³⁴⁵ For example, Call Agents, Session Border Controllers, Signaling Gateways, Call Session Control Functions (CSCF), and Home Subscriber Server (HSS) could be considered “critical” network elements.

³⁴⁶ See, e.g., WhatIs.com, “Confidentiality, availability and integrity (CIA triad),” <http://whatis.techtarget.com/definition/Confidentiality-integrity-and-availability-CIA> (last visited May 25, 2016); NSTAC, *An Assessment of the Risk to the Cybersecurity of the Public Network* (Aug. 2009) (noting the importance of providing network security to physical communications network components “which if damaged or manipulated, could degrade the confidentiality, integrity, and availability of data transiting the Internet.”).

³⁴⁷ *Protecting the Privacy of Customers of Broadband and Other Telecommunications Services*, WC Docket No. 16-106, FCC 16-39 (released Apr. 2016).

126. We seek broad comment on updates to our traditional NORS reporting processes and expectations when reportable broadband outages involving unintended software or firmware changes or unintended modifications to a database occur. We ask commenters to address whether valid public safety, national security, economic security or other reasons support the kind of granular reporting features we now describe for broadband, and whether such reasons justify treating broadband outage reporting differently from non-broadband outage reporting. Do commenters believe that alternative approaches should be explored that could ensure that the Commission receives all useful outage and disruption causation information in a timely and cost-effective manner?

127. Also, as discussed below, we propose to adopt the same reporting approach for interconnected VoIP providers as we have for legacy service providers (i.e., a notification, interim report and final report). We seek comment on this proposal. Alternatively, we seek comment on whether all reporting (i.e., legacy, broadband and interconnected VoIP) should be adjusted to a two-step process.³⁴⁸ Are there other similar steps that we should consider that would ensure adequate reporting in reasonable, appropriate time intervals across the various technologies at issue for reporting?

128. We seek comment on other steps the Commission can take to make providers' reporting obligations consistent across services or otherwise streamline the process. As with other covered providers in 4.9, we seek comment on whether 9-1-1 special facilities are served by BIAS and dedicated services providers such that a reporting requirement when 9-1-1 special facilities experiences a reportable outage or communications disruption would be warranted. Similarly, each covered provider in part 4 is required to report outages and communications disruptions to special offices and facilities (in accordance to 4.5 (a) through (d)). We seek comment on whether special offices and facilities are served by BIAS and dedicated services providers such that a reporting requirement when these experience a reportable outage or communications disruption would be warranted. One potential benefit of the transition to more advanced communications technologies is the ability to automate processes that historically have required a significant amount of manual processing. We seek comment on whether there are ways of automating the outage reporting process beyond what has been possible or has been attempted in the context of legacy communications services. How could such automated reporting be accomplished? What are the advantages of such a reporting mechanism? What are the disadvantages? What cost savings would result from any such automation?

4. Proposed Metrics and Thresholds for Broadband Network Outage Reporting

a. "Hard Down"³⁴⁹ Outage Events Metrics and Thresholds

129. In determining the appropriate metrics and thresholds for our broadband outage reporting proposals, we initially sought comment on the method for calculating the "user minutes" potentially affected by a broadband outage. In the *2011 Part 4 Notice*, we proposed using potentially-affected IP addresses as a proxy for the number of potentially affected users.³⁵⁰ At least one commenter claimed using IP addresses would tend to overstate the impact of an outage, and advocated using subscriber counts instead.³⁵¹ More recently, in response to our proposal for major transport facility outage reporting,³⁵² Comcast recommended using a "bandwidth-based standard" as a potential replacement for our user-

³⁴⁸ See generally ATIS Comments at 4; Sprint Comments at 5; CenturyLink Reply at 4; T-Mobile Reply at 3. While these issues were not raised in the *Notice*, we now seek further comment on them.

³⁴⁹ By "hard down" outage events, we refer to outages that result in loss of service, as opposed to performance degradations discussed below.

³⁵⁰ *2011 Part 4 Notice*, 26 FCC Rcd at 7184, para. 42.

³⁵¹ Verizon 2011 Comments at 23-24.

³⁵² *Notice*, 30 FCC Rcd at 3213, para. 21.

minute metric used for major transport facility outage reporting.³⁵³ In light of technological advances, we now seek to revisit this issue.

130. We further propose a throughput-based metric and threshold for “hard down” outage events.³⁵⁴ In light of significant changes in technology and the characteristics of broadband networks generally, we believe that it is appropriate to tailor our approach with respect to the identification of a threshold event for hard-down outages.³⁵⁵ Since part 4 was first enacted,³⁵⁶ the communications network architecture and elements, and the services carried over those networks, have grown more diverse and require increased throughput. The Commission currently uses DS3³⁵⁷ as the unit of throughput with which to calibrate our reporting threshold for major transport facility outages. Given the accumulating amount of throughput required to deliver today’s broadband services, we believe that 1 Gbps would function as a modern-day equivalent of the DS3 (45 Mbps) unit originally adopted in 2004.³⁵⁸ This can be seen in the increased deployments of residential communications services offering up to 1 Gbps in download speeds.³⁵⁹ As such, we tentatively conclude that the threshold reporting criterion for outages should be based on the number of Gbps minutes affected by the outage because Gb is a common denominator used throughout the communications industry as a measure of throughput for high bandwidth services.³⁶⁰ We further propose to introduce a broadband metric calibrated with the current 900,000 user minute threshold. In today’s broadband environment, a typical user requesting “advanced telecommunications capability” requires access to actual download speeds of at least 25 Mbps.³⁶¹ Accordingly, we calculate that if a facility with throughput totaling 1 Gbps providing individual users 25 Mbps of broadband capacity each, experienced a disruption to communications resulting in a complete outage, 40 individual users³⁶² would be impacted. In establishing a gigabit per second user minute threshold, we calculate that 900,000 user minutes divided by the 40 individual users impacted by the outage, results in 22,500 Gbps user minutes.³⁶³ This means that an outage event would become reportable

³⁵³ Comcast Comments at 6; Comcast August 27, 2015 *Ex Parte* (suggesting “1 GB outage that lasts for at least 30 minutes”). See also Section IV.A.1 *supra*.

³⁵⁴ We propose to define “throughput” as the amount of information transferred within a system in a given amount of time. See Appendix D.

³⁵⁵ We recognize that this proposal does not reflect our earlier discussion in the Report and Order that an OC12 threshold, which is approximately 622 million bps, is too high. See *supra*, Section IV.A.1. We believe that while an entire OC3 circuit may be dedicated to voice traffic, it is highly unlikely that an entire large-scale facility would be dedicated to voice traffic only, and therefore we propose rules in this Further Notice assume that facilities support mixed traffic.

³⁵⁶ 47 CFR § 4.7(d); 2004 Part 4 Order, 19 FCC Rcd at 16895-96, 16898, paras. 128, 132.

³⁵⁷ The Report and Order above adopts an updated metric, changing the standard from DS3 to OC3. See *supra*, Section IV.A.1.

³⁵⁸ We now calculate that a gigabit can support nearly 24 DS3s or 16,000 DS0s (64 Kbps voice or data circuits). 2004 Part 4 Order, 19 FCC Rcd at 16895-96, 16898, paras. 128, 132.

³⁵⁹ See Cox, Gigablast, <https://www.cox.com/residential/internet/gigablast.html> (last visited May 25, 2016).

³⁶⁰ 2004 Part 4 Order, 19 FCC Rcd at 16895, para. 128.

³⁶¹ 2015 Broadband Progress Report

³⁶² We calculate that 1Gbps in throughput total, which is converted to 1,000 Mbps, is divided by 25 Mbps as the download speed for each user, would result in a total of 40 individual users impacted by an outage event.

³⁶³ The 22,750 Gbps user minute figure was derived from the current threshold-reporting criterion of “900,000 user minutes.” 2004 Part 4 Order, 19 FCC Rcd at 16891-2, paras. 55-56. Assuming a 25 Mbps broadband user connection, as stated in the 2015 Broadband Progress America report, being delivered over a 1 Gbps facility, we compute: 1 Gbps divided by 25 Mbps equals 40 broadband user connections. Then, 900,000 user minutes divided by the number of impacted broadband user connections, 40, equals 22,750 Gbps user minutes.

when it resulted in 1 Gbps of throughput affected in which the event exceeds 22,500 Gbps user minutes. To determine whether an outage event is reportable using this threshold, we multiply the size of the facility measured in Gbps, by the duration of the event measured in minutes, and this total generates a Gbps user minute number. If this user minute number exceeds 22,500, then the outage event is reportable to the Commission. So for example, if a 1 Tbps (terabits per second) facility experienced a disruption for 45 minutes, we would multiply 1000³⁶⁴ by 45 minutes to get 45,000 Gbps user minutes, and since this figure exceeds 22,500 Gbps user minutes, the outage event would be reportable. We seek comment on the analysis presented, which would establish a reporting threshold of an outage of 1 Gbps (gigabit per second) lasting for 30 minutes or more.

131. We seek comment on a throughput-based metric and its advantages or disadvantages over a user-based metric, for example, a 900,000 user-minute metric that treats broadband users for measurement purposes as those broadband end users that have no service. We also seek comment on whether a throughput-based metric would be more appropriate for some networks rather others. For instance, would our proposed 1 Gbps throughput threshold be appropriate for both BIAS and dedicated services? If not, why not? Should we consider a throughput-based metric for BIAS networks set at a lower threshold, such as 25 megabits per second (Mbps)? Would this result in an unacceptably small number of outage reports? How well would a threshold of 1 Gbps or greater lasting for 30 minutes or more reflect the geographic scope and impact of an outage and the number of subscribers impacted by an outage? Would a user-minute based threshold better capture the geographic scope and impact of an outage and the number of subscribers impacted? Does using a throughput metric in lieu of potentially-affected IP addresses, or that of subscriber count, as described below, provide better information to the Commission? Would a throughput metric be less or more burdensome for providers than a user-based one? If so, why? How might the increasing availability of Gbps services affect the usefulness of throughput as an outage indicator? Is there a better throughput threshold than 1 Gbps or greater lasting for 30 minutes or more? If so, what would it be?

132. In addition, we revisit the 2011 proposal to use potentially-affected IP addresses as a proxy for the number of potentially affected users.³⁶⁵ If we were to adopt the 2011 proposal, would the metric overstate the impact of an outage?³⁶⁶ If so, by how much would the outage impact be overstated? How well could a potentially-affected IP addresses threshold effectively communicate the geographic scope and impact of an outage and the numbers of subscribers impacted? Would the increasing deployment of IPv6 addresses affect the utility or accuracy of this proposed metric, and if so, how?³⁶⁷ Would using subscriber counts as a proxy for number of users be a more accurate metric to determine the impact of an outage? In what ways do providers measure the number of subscribers now? Do providers measure broadband subscribers apart from other types of subscribers? If so, why? Which new subscribers would be counted under the proposed rules that were not previously counted? Should we consider unique subscriber-based metrics for BIAS and dedicated services provider? In instances of outage events lasting less than 30 minutes, should we consider whether subscriber-based metrics should be more indicative of a network outage impacting a large metropolitan area or geographic region? What benefit would this add to our proposed broadband outage reporting rules? Do current provider subscriber counts measure the total number of subscribers served at any given time? Are provider subscriber counts

³⁶⁴ For this calculation, we convert, and thus calculate that 1 Tbps is equal to 1,000 Gbps.

³⁶⁵ *2011 Part 4 Notice*, 26 FCC Rcd at 7184, para. 42.

³⁶⁶ *2011 Part 4 Notice*, 26 FCC Rcd at 7184, para. 42.

³⁶⁷ Internet Protocol version 6 (IPv6) is the new system that will expand the number of available IP addresses to handle the increasing number of devices connecting to the Internet. The current system, IPv4, only allows for 4 billion addresses, whereas IPv6 is estimated to allow the Internet to handle up to 340 trillion addresses. This will allow for more services (e.g., Internet of Things) to be introduced and connect more devices to the Internet. See Sébastien Ziegler, *et.al.*, *The Case for IPv6 as an Enabler of the Internet of Things*, IEEE Internet of Things (July 14, 2015) <http://iot.ieee.org/newsletter/july-2015/the-case-for-ipv6-as-an-enabler-of-the-internet-of-things.html>.

verified at the occurrence of an outage or disruption? What difficulties, if any, would covered broadband providers experience in applying a subscriber-based metric?

b. Performance Degradation Outage Events Metrics and Thresholds

133. The following section addresses requirements to report outage events in cases of significant degradation of communication. We tentatively conclude that outage events are reportable when there is a loss of “general useful availability and connectivity,” even if not a total loss of connectivity. We propose a series of metrics and thresholds that we believe could identify outage events that significantly degrade communications: (1) a combination of packet loss and latency metrics and thresholds, and (2) a throughput-based metric and threshold. Finally, we seek comment on the appropriate locations for significant degradation of communication measurements.

(i) “Generally Useful Availability and Connectivity”

134. Consistent with the part 4 definition of an “outage,” we again seek comment on whether covered broadband providers should be required to report disruptions that significantly degrade communications,³⁶⁸ including losses of “generally useful availability and connectivity” as measured by specific metrics.³⁶⁹ We tentatively conclude that outage events experiencing significantly degraded communications include those events with a loss of generally useful availability and connectivity, and seek comment on this tentative conclusion.

135. In 2011, ATIS stated that losses of “generally useful availability and connectivity” not resulting in a complete loss of service should not be reportable under the part 4 rules, arguing that such events are “more akin to static/noise on legacy communications systems or error rates in DS3 lines...”³⁷⁰ However, the loss of “generally useful availability and connectivity” in the broadband context would appear to be more akin to a legacy voice call during which the users cannot hear or make themselves understood, tantamount to a complete loss of service. This threshold may be even more recognizable in a digital context where effective bandwidth minimums are well understood. Accordingly, we reintroduce the Commission’s 2011 proposal to require covered broadband providers to report on losses of ‘generally-useful availability and connectivity’ to capture analogous incidents where customers are effectively unable to use their broadband service. We seek comment on this proposal.

136. We also seek comment on possible alternatives or additional metrics of generally-useful availability and connectivity. For instance, should the Commission create a reporting metric based on loss of network capacity? If so, how should the Commission quantify a loss of a network capacity for reporting purposes, and what would be an appropriate reporting threshold? Should we consider a metric measuring the average relative bandwidth, where providers would compare the active bandwidth against the provider’s bandwidth advertised or offered? Could such a metric be quantified for reporting purposes? If so, what would be an appropriate reporting threshold? What other metrics should the Commission consider?

(ii) Metrics for Performance Degradation

137. In addition to the metrics for generally-useful availability and connectivity, we seek comment on potential broadband outage reporting metrics to measure significant performance degradation in communications. In this regard, we propose two sets of proposals. We propose a throughput metric and seek comment on the appropriate thresholds; or, propose an alternative metric

³⁶⁸ See 47 CFR § 4.5(a) (defining an “outage” as “a *significant degradation* in the ability of an end user to establish and maintain a channel of communications as a result of failure or degradation in the performance of a communications provider’s network) (emphasis added).

³⁶⁹ We propose to define “generally useful availability and connectivity” to include the availability of functions that are part of the service provided (i.e., “service functionality”).

³⁷⁰ ATIS 2011 Comments at 11.

based in a combination of three core metrics, throughput, packet loss, and latency, and seek comment on the appropriate thresholds. Moreover, we seek comment on the extent potential metrics for generally-useful availability and connectivity may overlap with the proposed metrics for significant performance degradation in communications.

138. First, given that throughput is widely recognized as a key metric for measuring network performance, we propose using a throughput metric threshold at 1 Gbps for a network outage or service disruption event lasting 30 minutes or more. In addition to the use of a throughput metric for hard down outages described above, a throughput metric can also determine when a significant degradation occurs in a network, as transmission rates decline as network congestion increases. In addition to throughput, we seek comment on the utility of two other metrics to indicate broadband network performance degradation: packet loss and latency.³⁷¹ Can a proposed 1 Gbps event lasting for 30 minutes threshold capture instances in which the network suffers an outage or experience degradation in network performance? Would it be more appropriate to maintain the 900,000 user-minute threshold for throughput? If so, why? How would it be determined and calculated to be equivalent to a throughput-based metric of 1 Gbps threshold? How would maintaining the 900,000 user-minute threshold capture and account for the complexities found in broadband networks and the outages occurring on those networks? We also seek comment on whether a throughput threshold for performance degradation should require a carrier's average throughput to drop a nominal percentage, say 25 percent, below normal levels. How would such a threshold be measured and reported should this threshold be reached? Would this effectively capture the impact to network subscribers and facilities? Is a nominal drop of 25 percent in average throughput thresholds indicative of noticeable network performance degradation? We seek comment on this approach.

139. We seek comment on a second proposal looking at these proposed core metrics — packet loss, latency, and throughput. To what extent do covered broadband providers already collect information on packet loss, latency, and throughput? Are any of the metrics better suited than others at measuring loss of generally-useful availability and connectivity of broadband service? Are there any alternate performance metrics that would more effectively capture network outages or performance degradation? If so, what are they and do these providers already capture these metrics? Are any of the metrics more cost-effective to monitor than others, and if so, which are they and why?

140. We further propose to limit the scope of outage filings to those events that affect customer communications. We seek comment on this approach. In addition to packet loss, latency, and throughput, we seek comment on whether there are other metrics and thresholds that would be indicative of events impacting customer communications, and comment about other appropriate indicators that might better reflect when these communication services are disrupted. Are there existing measurement efforts regarding network performance and assurance conducted by the Commission that would provide better guidance in determining reporting thresholds for broadband network outage reporting?³⁷² How are these other performance and assurance measurements aligned with our proven public safety and reliability efforts in our current part 4 outage reporting efforts? How does the use of these network performance metrics complement or conflict with other efforts at the Commission?³⁷³

³⁷¹ In the recent *Technology Transitions* Further Notice of Proposed Rulemaking, we proposed to adopt metrics for latency, packet loss, and throughput to evaluate successful routing, completion of connections, and quality deterioration. *Technology Transitions, et al.*, Report and Order, Order on Reconsideration, and Further Notice of Proposed Rulemaking, 30 FCC Rcd 9372, 9483-84, para. 217 (2015).

³⁷² *See id.*

³⁷³ The Commission is providing guidance across a number of areas regarding network performance metrics and measurements ensuring users receive adequate and expected network performance from their service subscriptions. *See 2015 Open Internet Order*, 30 FCC Rcd at 5673-5674, paras. 165-68; *Applications of AT&T Inc. and DIRECTV*, Memorandum Opinion and Order, 30 FCC Rcd 9131, 9297, Appendix B (V)(2)(b)-(c) (2015); *Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible*

(continued....)

141. Alternatively, should we consider adopting more specific, absolute thresholds for packet loss, latency, and throughput to measure significant performance degradation of communications? In 2011, the Commission proposed that service degradation occurs whenever there is a noticeable decline in a network's average packet loss; or average round-trip latency; or average throughput of 1 Gbps, with all packet loss and latency measurements taken in each of at least six consecutive five-minute intervals from source to destination host.³⁷⁴ If absolute thresholds are preferable, how would these particular thresholds be calculated and determined? Would an absolute threshold still be appropriate with current broadband systems? How could the reporting thresholds for packet loss, latency, and throughput be set at appropriate levels? If any of these thresholds should be adjusted, what is an appropriate threshold? Should the requirement to take performance measurements in six consecutive five-minute intervals be modified? If so, how?

142. We also seek comment on whether these metrics support a consistent reporting standard across all broadband provider groups. The Commission recognizes that there may be different metrics for performance degradation for different services and that a "one size fits all" approach to determining appropriate metrics and thresholds indicating the health and performance of broadband networks and services may not be appropriate depending on underlying quality of service and network performance requirements.³⁷⁵ Are these metrics (packet loss, latency, and throughput) appropriate to evaluate performance for both BIAS and dedicated services? Alternatively, are these metrics unique to either BIAS or dedicated services, but not appropriate for both? We also seek comment on whether and how the proposed metrics should differentiate mobile broadband from fixed broadband. Are there unique attributes of mobile broadband that we should consider for our outage reporting purposes? For example, will application of these metrics to mobile broadband result in too many instances where, although a threshold is passed, there is no major problem with the network? Why or why not? Are other network performance metrics more suitable for mobile broadband than fixed broadband, and if so, what are they?

(iii) Measurement of Performance Degradation

143. We also seek comment on the end points from which covered broadband providers would measure whether there is performance degradation. In the case of BIAS providers, we believe that these metrics should be measured from customer premises equipment to the destination host. For dedicated services providers, we believe that the metrics should be measured from the closest network aggregation point in the access network (e.g., DSLAM serving DSL subscribers) to the closest network facility routing communications traffic or exchanging traffic with other networks (e.g., PoP, gateway).

144. We seek comment on these tentative conclusions, and on whether these end-points for measurement are appropriate for their corresponding services, as well as the use of the term "destination

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Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, at 23-30, paras. 49-70 (2016) (2016 Broadband Progress Report); Form 477 Resources, Information on Each Section of Form 477 (Sept. 26, 2014) <https://www.fcc.gov/reports-research/guides/form-477-section-specific-information>; Automated Reporting Management Information System (ARMIS), ARMIS Instructions & Data Descriptions (Dec. 22, 2014) <https://www.fcc.gov/general/armis-instructions-data-descriptions>; Instructions for Completing FCC Form 481, OMB Control No. 3060-0986 (High-Cost), OMB Control No. 3060-0819 (Low-Income), 1, 4 (Feb. 2015) (stating "Sections 54.313(a)(2)-(4) require ETCs annually to file information concerning outages, unfulfilled service requests, and complaints. ETCs must separately file these data for voice and broadband service, *except that, at this time, ETCs are not required to submit outage information regarding their broadband service.*") (internal citations omitted, emphasis added).

³⁷⁴ 2011 Part 4 Notice, 26 FCC Rcd at 7184-86, paras. 42, 48-49.

³⁷⁵ See ITU-T Recommendation Y.1541 Network Performance Objectives for IP-based services at <https://www.itu.int/rec/T-REC-Y.1541-201112-I/en>. Y.1541 is the recommendation from the International Telecommunications Standardization Sector (ITU-T) specifying the objectives of end-to-end network performance or performance between user network interfaces (UNI) based on Y.1540 parameters.

host” for all providers. Does “destination host” appropriately cover the various types of network facilities used by covered broadband providers to connect to their customers and/or exchange traffic with other networks? Where in a BIAS network should the measurements take place to record the measurements most accurately? In a dedicated services network? At what level of aggregation should the measurements be taken in the BIAS and dedicated services networks? What is the best way to determine the measurement clients and servers are correctly chosen to accurately measure the proposed metrics? Are there other terms that would better describe the point where network traffic is routed and aggregated from several endpoints (e.g., network aggregation point) for either type of service? For example, should we follow the performance metrics established under the Measuring Broadband America program or other broadband measurement metrics developed by the Commission?³⁷⁶ We also seek comment on a scenario in which the “destination host” is on another BIAS provider’s network. In that case, how would the original BIAS provider detect an outage on its network path?³⁷⁷ We seek comment on this scenario and anything else the Commission should consider with respect to network end-points.

5. Broadband Reporting Confidentiality and Part 4 Information Sharing

145. Currently, outage reports filed in NORS are withheld from routine public inspection and treated with a presumption of confidentiality.³⁷⁸ We propose to extend this same presumptive confidential treatment to any reports filed under rules adopted pursuant to this Further Notice, including broadband outage reporting filings. We recognize, however, that this approach of presumed confidentiality may need to evolve as networks, and consumer expectations about transparency, also evolve. Accordingly, we seek comment on the value and risk of increased transparency with respect to information about, or select elements of NORS reports filed under the current part 4 rules and any additional rules adopted pursuant to this Further Notice.

146. As noted in the Report and Order above, we believe that the proposal of sharing NORS information with state and other federal entities requires further investigation, including where state law would need to be preempted to facilitate information sharing.³⁷⁹ The Commission currently only shares access to the NORS database with DHS.³⁸⁰ However, we recognize the important roles of other federal and State agencies in promoting the reliability of broadband communications. For instance, the National Coordinating Center for Communications (NCC), a component of the National Cybersecurity and Communications Integration Center (NCCIC), provides a centralized point of coordination between the Federal government and the critical communications infrastructure sector during times of a communications-related crisis.³⁸¹ Additionally, several States have their own reporting requirements for

³⁷⁶ See, e.g., FCC Office of Engineering and Technology and Consumer & Governmental Affairs Bureau, 2015 Measuring Broadband America Fixed Broadband Report: A Report on Consumer Fixed Broadband Performance in the US (Dec. 30, 2015), <https://www.fcc.gov/general/measuring-broadband-america>; 2015 Open Internet Order, 30 FCC Rcd at 5674-75, para. 166 (delegating authority to the Commission’s Chief Technologist to offer guidance regarding acceptable methodologies for disclosure of network performance for BIAS service).

³⁷⁷ Currently, providers only report outages occurring in facilities that they own, operate, lease, or otherwise utilize. See 47 CFR § 4.9.

³⁷⁸ 2004 Part 4 Order, 19 FCC Rcd at 16856 47, para. 47 n.143. See also 47 CFR § 4.2.

³⁷⁹ See *supra* Section IV.E.3 para. 89.

³⁸⁰ 2004 Part 4 Order, 19 FCC Rcd at 16856, para. 47 (making NORS reports available to DHS “in encrypted form and immediately upon receipt”).

³⁸¹ The National Coordinating Center for Communications (NCC) is a public-private initiative led by DHS representing 24 federal agencies and more than 50 private-sector communications and information technology companies. See Department of Homeland Security, National Coordinating Center for Communications (Jan. 29, 2016), <http://www.dhs.gov/national-coordinating-center-communications>. As a part of DHS’s National Cybersecurity and Communications Integration Center, NCC monitors national and international incidents and events that may impact emergency communications. See *id.*

network outages and communications reliability³⁸² or otherwise incorporate the Commission's rules.³⁸³

147. To assist the Commission, we direct the Bureau to study these issues, and develop proposals for how information could be shared appropriately with state entities and federal entities other than DHS.³⁸⁴ Accordingly, we seek comment on the current reporting and information sharing practices of broadband and interconnected VoIP providers with state governments and other federal agencies. To which agencies and States do providers already report? To what extent is reporting mandatory? What information on outages or communications disruptions do providers report to other federal and state government bodies? What triggers the reporting process? What are the strengths and weaknesses of any existing reporting and information sharing processes? Could any such processes provide an avenue for the Commission to acquire data that it would otherwise receive under the proposed rules? If so, how? What else should the Commission consider regarding the current reporting and information sharing practices of broadband or interconnected VoIP providers? Commenters should address the impact of any other information sharing activities on the part 4 mandates proposed herein, and how these requirements might be tailored to ensure compliance without undue imposition on those other information sharing activities.

148. We seek comment on how the Commission can strike the right balance between facilitating an optimal information sharing environment and protecting proprietary information. Our goal is to foster reciprocal sharing of information on broadband network outages with federal and state partners, while maintaining confidentiality among those partners and of information contained in the outage reports. To ensure that the Commission benefits from information that providers make available to other federal agencies or state governments, should we encourage covered broadband and interconnected VoIP providers to provide the Commission with copies of any outage reporting that they currently provide to states or other federal agencies, to be treated in the same manner (i.e., confidential or non-confidential) as the entity receiving the original report? Are there alternative methods toward sharing this information? Should we ask our federal and state government partners to provide a preferred path toward sharing this information? We recognize that other federal and state agencies may have different requirements for licensees and FCC regulated entities, and we seek comment on the wider regulatory landscape in which broadband providers may or may not already be reporting outages. Are there special considerations required for the new filings or information collected that the Commission has not previously accommodated for part 4 providers? If so, what adjustments to our original information sharing proposals in the *Notice*³⁸⁵ should be made for these new NORS filings and information collected?

6. Cost-Benefit Analysis for Broadband Network Outage Reporting

149. In the *2012 Part 4 Order*, the Commission deferred action on several broadband outage proposals because they were “sharply opposed by industry on several bases, but especially based on the expected costs.”³⁸⁶ In this Further Notice, we seek to update the record on the costs of implementing

³⁸² See, e.g., Colo. Rev. Stat. § 723-2-2143(h); Or. Admin. R. 860-023-0055, 860-032-0012, 860-034-0390; 83 Ill. Adm. Code 725 and 730.550; 65-625 Me. Code R. 2 § 6; N.M. Admin. Code § 17.11.24; Conn. Agencies Regs. § 16-247g-2(d).

³⁸³ See Wyo. Admin. Code § PSC GEN Ch. 5 s 503; California Public Utilities Commission, Service Quality, <http://www.cpuc.ca.gov/General.aspx?id=1011> (last visited Mar. 30, 2016) (requiring “all facilities-based certificated and registered telecommunications carriers submit to the Commission the communication outage reports that affect California service filed with the FCC thru the NORS”).

³⁸⁴ See *supra* Section IV.E.3.

³⁸⁵ *Notice*, 30 FCC Rcd at 3224-25, paras. 51-55.

³⁸⁶ *2012 Part 4 Order*, 27 FCC Rcd at 2669, para. 48. Verizon, for instance, claimed that it alone would bear a cost burden in excess of \$100,000,000 to install a probe on every router in its network for the purpose of measuring jitter, latency and packet loss. Verizon 2011 Comments at 22.

broadband outage reporting, and also seek comment on the costs of compliance with any additional reporting requirements considered herein. We also seek comment on the costs associated with any alternative proposals or unintended modifications to proposals set out by commenters. Specifically, we invite comment on the incremental costs of detecting and collecting information on the outage thresholds described above; the costs of filing reports in NORS; and the costs associated with any additional reporting or other requirements the Commission may adopt to promote network reliability and security. Comments in this area should not focus on new equipment but on the cost of modifying existing outage detection systems to detect and notify the Commission on observed outages meeting reporting thresholds proposed in this Further Notice.

a. Costs of Detecting and Reporting Outages

150. We first consider the costs associated with detecting and collecting information on reportable outages under the proposed rules. As a general matter, we agree with the 2011 comments of the National Association of State Utility Consumers Advocates (NASUCA) and the New Jersey Division of Rate Counsel, who observe that VoIP and “broadband [providers] should already be collecting outage-related data in the normal course of conducting their businesses and operations.”³⁸⁷ We believe this to be as true today as it was in 2011 in light of service providers’ public assurances of network performance and reliability.³⁸⁸ If covered broadband providers already collect internal data to support claims of high network reliability through advertising, we anticipate that they would be able to provide the Commission with similar information at minimal incremental cost. For this reason and others discussed below, we do not believe that requiring covered broadband providers to submit outage data would create an unreasonable burden.

(i) Outages Defined by Threshold Events

151. To begin, we note that nearly all providers already have mechanisms in place for determining when an outage occurs and when it surpasses a certain threshold, and if a provider does not, in today’s wired world it would not impose significant cost to install such a mechanism. In fact, the record reflects that providers routinely monitor the operational status of their network as part of the normal course of business. Verizon, for instance, explained in 2011 that it “has significant visibility into its broadband networks.”³⁸⁹ We believe that any provider with “significant visibility” into its network already has the ability to detect network failures or degradations that result in a total loss of service for a large number of customers. Commenters appear to concede this view. Both ATIS and AT&T proposed alternative reporting schemes that would require reporting on total losses of broadband service, and AT&T submits that its proposed scheme would be “unambiguous and easy-to-apply.”³⁹⁰ CenturyLink likewise admits that “reporting by a broadband Internet access service provider where there is a loss of connectivity to the Internet by end-users is reasonable.”³⁹¹ Comments like these, along with ubiquitous advertising on network reliability and performance generally, suggest that the regime described above to report total losses of broadband service would not impose significant additional burdens on providers. We seek comment on this discussion.

³⁸⁷ NASUCA and NJ Rate Counsel 2011 Comments at 11.

³⁸⁸ See, e.g., Verizon Wireless, Better Matters, <http://www.verizonwireless.com/landingpages/better-matters/> (last visited May 25, 2016) (stating that “RootMetrics® rates Verizon #1 in speed, data, reliability and overall performance in the U.S.”).

³⁸⁹ Verizon 2011 Comments at 22.

³⁹⁰ ATIS 2011 Comments at 14-15; AT&T 2011 Comments at 26.

³⁹¹ CenturyLink 2011 Comments at 13.

(ii) Outages of “Generally-Useful Availability and Connectivity”

152. In 2011, industry commenters identified data collection costs as the most significant cost burden of the proposed rules for performance degradation events.³⁹² However, we note that the proposed reporting based on loss of “generally-useful availability and connectivity” does not concern every degradation in performance an individual user experiences, but is instead designed to capture incidents in which service is effectively unusable for a large number of users or when critical facilities are affected. We seek further comment on the extent to which providers already collect performance degradation data for internal business purposes. In 2011, covered VoIP and broadband providers were already monitoring QoS metrics, like packet loss, latency and jitter, to assess network performance for certain customers.³⁹³ Today, providers collect network performance information as a necessary part of fulfilling their SLA duties for particular customers,³⁹⁴ and more generally, providers have significant incentives to track these metrics as part of their network, service, and business risk assurance models. In other words, providers’ existing approaches for network data collection for premium customers likely already captures losses of “generally-useful availability and connectivity,” and we believe similar techniques could be expanded to monitor network performance on a broader scale. By building on existing provider practices and harnessing technological developments in network monitoring, we believe that the proposals for broadband reporting requirements described herein would not be unduly costly.³⁹⁵

153. Because providers already routinely collect much of this data, we believe that the cost of compliance of additional rules would be only the cost of filing additional reports. We seek comment on this discussion. If providers do not collect this data, is there similar or comparable data that providers already collect, or could collect at minimal expense, that would be as cost-effective as data they would report under the proposals outlined above? If so, what data, and would it provide the Commission with adequate visibility into events that cause a loss of generally-useful availability and connectivity for significant numbers of broadband users? What would the cost be of this comparable data?

154. We seek comment on whether we should implement a prototype phase of two years whereby providers would be given significant latitude to determine a qualifying threshold for the “generally useful availability and connectivity” standard. While mandatory reporting would remain, the data collected would positively inform standards in this category that would be broadly applicable to the Commission’s needs in this area yet closer to what the reporting companies use for their own operations, thereby reducing potential costs for providers. We seek comment on this analysis.

b. Costs of Filing Outage Reports

155. While we anticipate that the costs of filing reports under the proposed rules—i.e., of reformatting and uploading information in the NORS database—would not impose an unreasonable burden on covered broadband providers, we seek comment on the specific costs. Outage reports are currently filed in the Commission’s web-based NORS database using simple and straightforward “fill-in-the-blank” templates. NORS currently accepts reports for legacy service outages (wireline, wireless,

³⁹² See, e.g., Verizon 2011 Comments at 22; ACA 2011 Comments at 6.

³⁹³ For example, in 2011 AT&T stated that it collects information on packet loss and latency for “premium managed access enterprise” customers. See AT&T 2011 Comments at 28 (describing how AT&T may monitor these characteristics for certain premium customers, pursuant to the terms of an SLA).

³⁹⁴ See e.g., Sprint, SLA Performance, https://www.sprint.net/sla_performance.php?network=sl (last visited May 25, 2016); Cogent, Networks Services Service Level Agreement, http://www.cogentco.com/files/docs/network/performance/global_sla.pdf (last visited May 25, 2016); Internet2 Network, Internet2 IP Layer RealTime Atlas, http://atlas.grnoc.iu.edu/atlas.cgi?map_name=Internet2%20IP%20Layer (last visited May 25, 2016); Verizon, www.verizonenterprise.com/terms/us/products/internet/sla (last visited May 25, 2016); Keynote, Internet Health Report, <http://internetpulse.keynote.com/Main.aspx> (last visited May 25, 2016).

³⁹⁵ AT&T 2011 Comments at 28 (arguing that reporting QoS information from every internet PoP would be burdensome).

etc.), as well as interconnected VoIP “hard down” outages. We expect that any reports from covered broadband providers pursuant to rules ultimately adopted in this proceeding would adhere to the same efficient and streamlined process.

156. In light of growing overlap in corporate ownership of telecommunications network and service offerings, we expect that the inclusion of broadband service under part 4 would largely extend reporting obligations to providers already familiar with reporting via NORS and with internal processes in place for filing reports.³⁹⁶ We recognize that entities without prior experience reporting in NORS, either themselves or through affiliates, may incur some startup costs, i.e., of establishing a NORS account and training personnel in the use of NORS. We seek comment on this analysis and what specific startup costs would be.

157. Furthermore, we believe the overall cost to providers of filing disruption reports is a function of the number of reports that are filed and the costs of filing each report. Previously, the Commission has estimated that the filing of each three-stage outage report (i.e., notification, initial report, and final report) requires two hours of staff time, compensated at \$80 per hour, amounting to a \$160 total cost for the provider.³⁹⁷ We believe that this estimate remains valid. Moreover, we estimate that adoption of the proposed rules for covered broadband providers would result in the filing of 1,083 reports per year, based on the likely correlation of broadband Internet access service outages with interconnected VoIP outages, in which there were 750 reports in 2015, and of broadband backbone outages with interoffice blocking outages, in which there were 330 reports in 2015.³⁹⁸ Accordingly, we estimate that adoption of the rules proposed in this Further Notice would create \$173,280 in reporting costs.³⁹⁹ We seek comment on this cost estimate.

c. Benefits of Proposed Broadband Network Outage Reporting

158. On balance, we believe that the proposals of this Further Notice would ultimately produce substantial benefits for the public. As noted above, the nation is increasingly reliant on broadband communications, and disasters, pandemics, and cyber attacks can lead to sudden disruptions of normal broadband traffic flows. Adopted prior to widespread adoption of broadband, the current part 4 outage reporting rules have played a significant role in the Commission’s successful efforts to promote reliable and resilient communications networks. The Commission’s receipt of data on broadband service (and expanded interconnected VoIP service) disruptions would enable it to adapt this established practice to a world in which IP-based networks are increasingly relied on for critical communications—including 911 service—as well as for financial transactions, health care delivery and management, and the operation of our nation’s critical infrastructure.⁴⁰⁰

159. Given the large and rising volume of communications that occur over broadband networks—and the overall economic value these communications represent⁴⁰¹—even minor increases in

³⁹⁶ This is because of the large overlap between companies providing VoIP services already subject to NORS outage reporting, and those offering BIAS service.

³⁹⁷ See, e.g., Federal Communications Commission, Part 4 of the Commission’s Rules Concerning Disruptions to Communications OMB Control# 3060-0484 Supporting Statement (2012) at 11, <http://www.reginfo.gov/public/do/DownloadDocument?documentID=337494&version=1>.

³⁹⁸ In other words, based on 2015 figures, we estimate that there would be approximately 750 reportable VoIP outages + 330 reportable broadband outages independent of VoIP = 1,083 total reports.

³⁹⁹ This estimate was calculated by adding the number of VoIP and broadband outages in 2015, and multiplying by the expected cost of \$160.

⁴⁰⁰ See, e.g., FSSCC 2011 Comments at 2; UTC 2011 Comments at 3; California Telehealth Network Comments in GN Docket. No. 14-28 at 7, 9.

⁴⁰¹ See, e.g., U.S. Dep’t of Commerce, U.S. Census Bureau News (Feb. 17, 2016), https://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf (estimating that \$80.3 billion in U.S. retail e-

(continued....)

network reliability that result from outage reporting could have a significant public benefit. We believe that the benefits of the proposed reporting requirements will be substantial, as increases in network reliability can improve not only business continuity, but also the availability of emergency response, thereby saving many lives.⁴⁰² We therefore expect that, even if only a few lives are saved each year, the annual benefit from these proposed changes will far exceed the costs they impose on affected parties. We have noted throughout this Further Notice that the harm from not requiring broadband outage reporting could be substantial, and we believe that the benefits of the proposals would far exceed the costs. We seek comment on other harms that consumers or providers face currently or may face in the future as a result of loss of connectivity that could have been avoided if industry outage trends had been spotted earlier and addressed more constructively through NORS reporting. We seek comment on the total expected benefit of the proposed reporting requirements for broadband providers.

C. Interconnected VoIP Outage Reporting

160. In 2012, the Commission adopted limited outage reporting requirements for interconnected VoIP providers.⁴⁰³ The rules apply to both facilities-based and non-facilities-based interconnected VoIP services.⁴⁰⁴ Since extending outage reporting to interconnected VoIP, however, the Commission has not received consistent, timely, or sufficiently detailed reporting needed to promote greater interconnected VoIP service.⁴⁰⁵ This causes us now to raise questions about how to stimulate granular and consistent reporting for interconnected VoIP providers that aids the Commission in its efforts to ensure reliable, resilient, and secure interconnected VoIP service for America's consumers and businesses. Accordingly, we propose to modify the existing reporting process for interconnected VoIP to hew closer to the process for other providers. Lastly, we seek comment on whether there are any differences between interconnected VoIP services and other foregoing broadband services that weigh in favor of establishing different outage reporting rules for the two kinds of service providers.

1. Interconnected VoIP Outage Reporting Process

161. We propose to amend the reporting process for outages involving interconnected VoIP service to harmonize it with the "legacy" services and the proposed reporting process for broadband

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commerce sales occurred in the first quarter of 2015); Noyes, Katherine, "The cost of a data breach has jumped 23 percent in two years," PC World (May 27, 2015), <http://www.pcworld.com/article/2927618/the-cost-of-a-data-breach-has-jumped-23-percent-in-two-years.html>.

⁴⁰² The Value of a Statistical Life (VSL) is a measurement of the amount that society is generally willing to pay to avoid the loss of one life. After completing a review of technical literature on the VSL, in 2013 the Department of Transportation valued the VSL is \$9.1 million. *See* <http://www.dot.gov/office-policy/transportation-policy/guidance-treatment-economic-value-statistical-life>. We continue to project, as described in the *Notice*, that improving the Part 4 reporting process will expedite the implementation of voluntary network improvements that will result in the reduction of outage incidence. It follows that if the number of outages is reduced, then a greater number of 9-1-1 calls would be successfully delivered, and we believe that at least one life would be saved as a result. Using the VSL value set forth by the Department of Transportation, the value of the lives saved would be in excess of the costs associated with the reporting changes described herein.

⁴⁰³ Interconnected VoIP services allow a wireline or wireless user generally to receive calls from and make calls to the legacy public telephone network, including calls to 911. Section 9.3 defines "Interconnected VoIP service" as "a service that: (1) [e]nables real-time, two-way voice communications; (2) [r]equires a broadband connection from the user's location; (3) [r]equires Internet protocol-compatible customer premises equipment (CPE); and (4) [p]ermits users generally to receive calls that originate on the public switched telephone network." 47 CFR § 9.3.

⁴⁰⁴ *2012 Part 4 Order*, 27 FCC Rcd at 2680, para. 72. Non-facilities-based VoIP providers—also known as "over-the-top" VoIP providers—offer service directly to customers over the network services of an Internet service provider. These services often take the form of a communications service application offered over IP-based networks.

⁴⁰⁵ *2012 Part 4 Order*, 27 FCC Rcd at 2688-90, paras. 95-101.

outages.⁴⁰⁶ With the appropriate metrics, outage reporting provides the Commission with timely situational awareness of the reliability of the commercial communications infrastructure. As stated before, a vital purpose of network outage reporting has always been to enhance the situational awareness of the Commission, so that the agency can direct emergency response efforts appropriately during the course of an incident and in its immediate aftermath.⁴⁰⁷ However, because the current outage reporting rules for interconnected VoIP allow a 24-hour notification period and do not require interim reports, the Commission rarely learns of interconnected VoIP network outages in near real time, and often has to wait almost a month until the final report is submitted to get outage event root causes or other useful information.⁴⁰⁸

162. Under the part 4 rules for legacy services,⁴⁰⁹ initial reports provide the Commission with timely access to more detailed information about an outage than was available to the provider at the time of the notification, in many cases confirming the existence of an outage that was only tentatively reported at the notification stage. However, such initial reports are not required of interconnected VoIP providers, and what's more, the 24-hour notification period has resulted in notifications being filed well after an outage has commenced, in some cases after the outage has concluded. In one recent instance, an interconnected VoIP outage that affected close to 1 million users across nearly a dozen states was first reported to the Commission twenty-three hours after its discovery.⁴¹⁰ Consequently, for certain interconnected VoIP outages, the Commission must wait until a final report is filed – up to thirty days after the notification is filed – to receive any information about the underlying cause of an interconnected VoIP outage, or even to verify that a reportable outage in fact occurred. Providers also do not report information on the duration of the outage in the notification, and are currently only required to give this information 30 days later in the final report.⁴¹¹ Thus, we believe that the abridged reporting adopted for interconnected VoIP “hard down” outages creates significant gaps in the Commission’s visibility into such outages and hinders its ability to take appropriate remedial actions.

163. We recognize that a lack of visibility into underlying broadband networks may pose challenges to interconnected VoIP providers, in providing information as the cause of the outage. As with BIAS and dedicated services providers, we seek comment on whether interconnected VoIP providers can, do, or should take steps contractually or otherwise to address these problems. At a minimum, we believe that providers should make reasonable efforts to learn about the causes of any reportable outages and thus to be in a position to include such information in their reports, irrespective of whether the affected facility is within their control.⁴¹² Moreover, because interconnected VoIP services often rely on networks that

⁴⁰⁶ For further discussion regarding the reporting process in general, *see supra* section V.B.3, para. 131.

⁴⁰⁷ *See, e.g., 2011 Part 4 Notice*, 26 FCC Rcd at 7170, para. 9 (discussing the Commission’s use of outage data during Hurricane Katrina “to identify specific needs for security, fuel and other support and help guide and prioritize Federal restoration efforts”).

⁴⁰⁸ Although the NORS reports themselves are confidential, PSHSB staff confirms this to be true.

⁴⁰⁹ 47 CFR § 4.11.

⁴¹⁰ PSHSB staff confirms that the Commission’s awareness of the consequences and circumstances surrounding this incident prior to the arrival of this report was based on publicly available news reports, which the Commission later determined had understated its effects. There have also been outages that affected both interconnected VoIP and other services, and while the Commission was quickly notified of the impact to other services, it was not notified of the interconnected VoIP outages until much later.

⁴¹¹ *See 2012 VoIP Report and Order*, 27 FCC Rcd at 2689-90, paras. 98-101.

⁴¹² At the present time, interconnected VoIP providers must submit notifications and final reports in good faith, where the person submitting the final report is “authorized to legally bind the provider to the *truth, completeness, and accuracy of the information* contained in the report,” and attests that “on oath deposes and states that the information contained therein is *true, correct, and accurate to the best of his/her knowledge and belief* and that the *communications provider* on oath deposes and states that this information is *true, complete, and accurate.*” 47 C.F.R. § 4.11 (emphasis added).

provide BIAS services, we believe that the proposed rules for broadband outage reporting discussed *supra* largely eliminate this concern and essentially place interconnected VoIP providers on the equal footing with other part 4 entities. Accordingly, we propose to replace the existing reporting structure for interconnected VoIP with the three-report structure used by all other reporting entities, as originally proposed in the *2011 Part 4 Notice*.⁴¹³ Specifically, we propose to tighten the timeframe for interconnected VoIP providers to notify the Commission of an outage from 24 hours to 120 minutes;⁴¹⁴ to require providers to file an initial report with additional information within 72 hours; and to file a final report within 30 days of the outage that includes all pertinent information about the outage, including any information available that was not contained in or changed from the initial report.⁴¹⁵ All reports would be filed electronically with the Commission.

164. Furthermore, although not independent triggers for part 4 reporting, we expect providers to include information in their reports concerning (1) the failure of facilities that might be considered critical network elements,⁴¹⁶ and (2) unintended changes to software or firmware or unintended modifications to a database to the extent relevant to a given outage or service disruption that is otherwise reportable. As described fully in the broadband reporting process above,⁴¹⁷ reports should include specific details.

165. At this time we believe adopting a three-part reporting structure for interconnected VoIP outages is appropriate, however, as raised for broadband outage reporting above, we seek comment on other steps the Commission can take to make providers' reporting obligations consistent across services or otherwise streamline the process. We seek comment on whether there are ways of automating the outage reporting process for interconnected VoIP service providers beyond what has been possible or has been attempted in the context of legacy communications services. How could such automated reporting be accomplished? What are the advantages of such a reporting mechanism? What are the disadvantages? What cost savings would result from any such automation? Alternatively, we seek comment on maintaining the two-step process for interconnected VoIP outages.

2. Proposed Interconnected VoIP Outage Metrics and Thresholds

a. Outages Defined by Performance Degradation

(i) Metrics for Performance Degradation

166. We also propose to require interconnected VoIP providers to report outages that reflect losses of "generally useful availability and connectivity" as defined by specific metrics.⁴¹⁸ Similar to our

⁴¹³ *2011 Part 4 Notice*, 26 FCC Rcd at 7190-92, paras. 61-65.

⁴¹⁴ 47 CFR § 4.9(g)(ii). This proposal is distinct from and would not impact interconnected VoIP providers' obligation to notify the Commission and any affected PSAPs within 240 minutes of discovering an outage that potentially affects a 9-1-1 facility. See 47 CFR § 4.9(g)(i).

⁴¹⁵ See generally 47 CFR § 4.11 (required information for notifications and initial and final reports under Part 4).

⁴¹⁶ We consider a network element "critical" if the failure of that network element would result in the loss of any user functionality that an interconnected VoIP provider provides to its consumers. For example, Call Agents, Session Border Controllers, Signaling Gateways, Call Session Control Functions (CSCF), and Home Subscriber Server (HSS) could be considered "critical" network elements.

⁴¹⁷ See *supra* Section V.B.3 (discussing the expectation that providers include information in their NORS filings on any relevant failure of facilities that might be considered critical network elements, or any unintended changes to software or firmware or unintended modifications to a database, for outages that are otherwise reportable).

⁴¹⁸ 47 CFR § 4.5(a) (defining an "outage" as "a *significant degradation* in the ability of an end user to establish and maintain a channel of communications as a result of failure or degradation in the performance of a communications provider's network) (emphasis added).

proposal for covered broadband providers,⁴¹⁹ we propose to base performance degradation on packet loss and latency for any network facility used to provide interconnected VoIP service. We also seek comment on whether it would be appropriate to adopt a throughput-based outage metric for interconnected VoIP outage reporting in addition to the throughput metric discussed above with respect to broadband providers, i.e., providers would be required to report an outage of 1Gbps or more of interconnected VoIP service for 30 minutes or more. Are the proposed metrics – relating to packet loss, latency and throughput – well-suited for interconnected VoIP? Would this approach provide better methods for detecting and reporting outages on interconnected VoIP networks?

167. We recognize that adopting performance degradation metrics may result in an increased burden on VoIP providers than their legacy voice counterparts. We ask whether interconnected VoIP's unique technology justifies a departure from a pure "hard down" reporting metric currently required for interconnected VoIP providers and that of legacy counterparts, to the adoption of significant performance degradation reporting metrics? Are there throughput-related issues associated with interconnected VoIP calling? For example, where the service might be up and running, yet be degraded to a point that emergency call information exchange is negatively impacted? Or, given interconnected VoIP's dependence on broadband connectivity, are there vulnerabilities associated with that technology that introduce threat scenarios (i.e., attack vectors) that justify the added reporting burden? Are there other considerations we should take into account on the question of adding a performance degradation element to interconnected VoIP providers' obligations under part 4?

168. As with our current "hard down" outage reporting for interconnected VoIP, we propose to apply any new rules to both facilities-based and non-facilities-based interconnected VoIP. Do interconnected VoIP providers have differing standards for network performance? Are non-facilities-based interconnected VoIP providers able to measure and/or access packet loss, latency, and/or throughput measurements? If not, why? How are non-facilities-based interconnected VoIP providers able to determine the network performance requirements for their service? Should the Commission instead adopt a single metric beyond which voice service is so degraded that it is no longer functional? If so, what is that metric and how and where is it measured? Would multiple metrics be required? If so, what would those metrics and how and where would they be measured? We seek comment on these proposals. We also seek comment on how the proposed metrics apply to mobile VoIP. Will application of these metrics to mobile VoIP result in too many instances where, although the threshold is passed, there is no major problem with the network? Are there other metrics that are better suited for mobile VoIP service? If so, why? Should the monitoring period and metrics adopted for interconnected VoIP outage reporting be consistent with the monitoring period and metrics adopted for broadband outage reporting, or are there differences between the two types of services that warrant different monitoring period and metrics?

169. Alternatively, as with our proposed broadband outage reporting, we could adopt more specific, absolute thresholds for performance degradation, like those proposed in the *2011 Part 4 Notice* for broadband providers, e.g., service degradation occurs whenever there is: (i) an average packet loss of 0.5 percent or greater; or (ii) average round-trip latency of 100 ms or greater, with all measurements taken in each of at least six consecutive five-minute intervals from source to destination host.⁴²⁰ If absolute

⁴¹⁹ See *supra* Section V.B.4.b. (i) and (ii).

⁴²⁰ See *2011 Part 4 Notice* 26 FCC Rcd at 7184, para. 42. In 2011, some commenters supported performance degradation metrics to guarantee the FCC receives sufficient information regarding new communications platforms. See, UTC 2011 Reply at 2 (arguing outage reporting will promote the reliability of the networks); National Association of State Utility Consumer Advocates 2011 *Ex Parte* Comments at 3 (stating the FCC should receive sufficient information for quality assurance purposes). Others opposed the performance degradation metrics for interconnected VoIP and broadband. See Century Link 2011 Comments at 6-7 (stating definition of an interconnected VoIP outage must be limited to "complete loss of service"); T-Mobile 2011 Comment at 10-11 ; US Telecom 2011 Comment at 7-8; ATIS 2011 Reply at 11-12; XO Communications 2011 Reply at 3. A few commenters stated that the proposals were akin to burdensome quality of service metrics, and that they are more

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thresholds are preferable, are these reporting thresholds for packet loss and latency set at appropriate levels for interconnected VoIP service? Should the Commission adjust any of these thresholds and, if so, what is an appropriate threshold? Should the Commission modify the requirement to take performance measurements in six consecutive five-minute intervals? If so, how?

(ii) Measurement of Performance Degradation

170. Moreover, we seek comment on the end-points from which interconnected VoIP providers will need to measure these metrics. We recognize that it is important to consider the methods used to measure the proposed metrics and account for the location of the network elements within the interconnected VoIP networks. This will help to ensure accurate and reliable measurements of the proposed metrics to indicate network performance. We propose that these metrics be measured from “source to the destination host.” The term “source” would refer to the network elements responsible for the setting up the VoIP call (e.g., call manager, user agent, client) while the term “destination” would refer to the endpoints routing and executing the call (e.g., VoIP router, softphone). We seek comment on the use of the terms “source” and “destination host” and ask if these terms appropriately cover the various types of network facilities (e.g., CSCF, HSS, AAA servers, SIP servers, Session Border Controllers, Media Gateway Controllers) used by interconnected VoIP providers to connect to their customers and/or exchange network traffic with other interconnected VoIP networks? Are there other terms that would better convey the network elements from which interconnected VoIP providers will need to measure the proposed reporting metrics?

b. Benefits and Costs of Proposed Reporting

171. We seek comment on whether the benefits of this additional reporting would outweigh the incremental burden on providers. We estimate that the three-part reporting of an outage—including the filing of a notification, initial report, and final report—imposes only a \$300 cost burden on the provider.⁴²¹ We therefore do not believe that expanding the reporting process from two reporting stages to three would significantly increase burdens for providers. We seek comment on this tentative conclusion. To the extent that commenters disagree, we seek comment on alternative, least costly methods. Is there similar or comparable data that providers already collect, or could collect at minimal expense given current data collection practices, that would be more cost-effective to report than the data they would report under the proposed rules? If so, what data, and would it provide the Commission with adequate visibility into events that cause a loss of generally-useful availability and connectivity for significant numbers of interconnected VoIP users? What would the cost be of this comparable data?

172. We believe that the benefits of the proposed rules would exceed the costs. Absent the rules proposed in this Further Notice, the Commission lacks sufficient visibility into the reliability and security of interconnected VoIP networks. We believe that relevant data is already routinely collected by interconnected VoIP providers (in real time), so the cost of compliance would be only the cost of filing additional reports where necessary.⁴²² Moreover, we believe that many of the proposed outage reporting triggers for interconnected VoIP, including those based on performance degradation, are likely to be covered by outages to the underlying broadband networks. Therefore, we do not believe the number of additional reports filed annually pursuant to the proposed rules for interconnected VoIP to be significant. We seek comment on this discussion.

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appropriate for enterprise-level customers and not mass market offerings. AT&T 2011 Reply at 8; Verizon 2011 Comments at 21-2.

⁴²¹ In 2015, the Commission reviewed 750 interconnected VoIP outages. We expect to review an additional 750 filings for the same number of outages received in 2015, and an additional 75 filings as a result of our performance degradation proposal discussed above. Therefore, $(750 + 75)$ initial reports \times 0.75 hours it takes to complete an initial report \times cost of \$80 employee hourly rate = \$49,500 added cost.

⁴²² See *id.*

D. Call Failures in the Radio and Local Access Networks

1. Background

173. In the *2015 Part 4 Notice*, we sought comment on the reporting of call failures that result from congestion in wireless radio access networks (RAN), and in non-wireless (i.e., wireline and VoIP) local access networks.⁴²³ We noted that the inability of the access network to support excess demand may not be considered reportable as a “failure or degradation” under our current rules, but the inability of consumers to make calls still undermines the reliability of networks.⁴²⁴ Nevertheless, we are concerned about the impact of such events on the reliability of 911 service. Because this appears to be predominantly an issue with wireless networks, we proposed to amend our part 4 rules to require reporting of systemic wireless call failures that results from overloading in the RAN.⁴²⁵

174. While commenters oppose reporting such call failures for a variety of reasons, they primarily argue that networks should not have to be designed to accommodate high-volume calling events.⁴²⁶ Commenters assert that networks that could manage every call during a high-volume calling event would be cost-prohibitive, and at the very least, not cost-effective.⁴²⁷

175. Requiring reporting of overloading in the access network (wireless radio or non-wireless local access) should not be interpreted to mean that providers must engineer their networks to account for sporadic spikes in calls. Instead, the reports would provide the Commission with data to identify any trends in network overloading. This could include identifying, for example, a particular network equipment that may be more susceptible to failure in mass calling events. Moreover, analysis of this data allows the Commission to work with industry to address situations where the network consistently fails to address “bursty” call patterns similar to those generated after disaster and wide-scale emergencies. While we recognize the point made by several commenters that networks should not be engineered to be able to transmit every single call if everyone in an area attempted to use the network at once, we believe that it would be in the interest of the public for the Commission to receive information on those situations, so that we can determine if, when, and where, blocking is consistently happening.

176. Verizon argues that such reporting that would be collecting information “for the sake of it,”⁴²⁸ but that point ignores the premise behind our outage reporting rules. Although situational awareness is one goal of outage reporting, another key objective is to provide data to the Commission so that it can detect adverse outage trends and facilitate industry-wide network improvements. Moreover, even though we continue to believe that outage reporting encourages providers to fix problems in their networks, we note that many outage reports do not always result in permanent fixes to the network, as the outage may be a “one-off” event. However, as Public Knowledge observes,⁴²⁹ we will not know that such events are indeed “one-off,” if the Commission is not aware of them in the first place.

177. Commenters also note that mass calling events are often unpredictable and typically short-lived, so they question the value of reporting on such events.⁴³⁰ However, because a mass calling

⁴²³ *Notice*, 30 FCC Rcd at 3211-12, paras. 14-18.

⁴²⁴ *Id.*

⁴²⁵ *Notice*, 30 FCC Rcd at 3211, para. 14.

⁴²⁶ ATIS Comments at 6; AT&T Reply at 9; CTIA Comments at 6; NTCA Reply at 8-9; Sprint Comments at 3-4; T-Mobile Reply at 5; Verizon Comments at 5; Verizon Reply at 5-6.

⁴²⁷ ATIS Comments at 6; AT&T Reply at 9; CTIA Comments at 6.

⁴²⁸ Verizon Comments at 5.

⁴²⁹ Public Knowledge August 17, 2015 Ex Parte.

⁴³⁰ *See, e.g.*, Sprint Comments at 3-4.

event can be the consequence of a widespread disaster,⁴³¹ we see significant value in collecting information on such events, as these are the incidents where reliable, resilient communications are most needed. Indeed, understanding failure patterns in moments of network saturation can help identify best practices for network management, as well as help certain communities realize a need for greater detail in emergency management plans. We recognize that reporting on mass calling events will not prevent them from occurring in the future, but we believe there is substantial value in analyzing such events in hindsight, as individual providers are unlikely to be able to see how such an event fits into broader industry practices and performance levels. With such data, the Commission would be in a better position to work with providers to address industry-wide problems and share industry-wide mitigation solutions.

2. Proposed Rule

178. With respect to wireless RANs, we propose to consider a cell site to be “out” whenever a cell tower operates at full capacity (i.e., is unable to process any additional calls) for 75 percent of the time during a period of at least 30 minutes. If the number of potentially-affected wireless user-minutes exceeds 900,000 for the cell sites considered “out,” the outage would be reportable. Similarly, for non-wireless local access networks, we propose to amend our outage reporting rules to consider a loop carrier system or remote switch to be “out” whenever a remote terminal or the group of channels connecting a remote switch to a host operates at full capacity (i.e., is unable to process any additional calls) for 75 percent of the time during a period of at least 30 minutes. If the number of user-minutes exceeds 900,000 for the loop carrier systems and remote switches that are considered “out,” the outage would be reportable.

179. We seek comment on these proposals. Is 30 minutes an appropriate time period to measure call blockages? If not 30 minutes, what should be the appropriate interval of measurement for averaging purposes? Is 75 percent of that time at full capacity the right percentage of time? Alternatively, what percentage of calls blocked during that period constitutes congestion of the access network? To the extent that commenters oppose our proposal, we encourage them to propose an alternative, workable metric that addresses our concern. Is there a better way to measure persistent, widespread call failures in the RAN or local access network?

180. With respect to wireless RANs, we seek comment on how providers currently measure call failures. Would providers know of, and therefore have a way to measure, call attempts when a cell site is fully congested and not accepting call origination information? Also, given that wireless calls are constantly initiated and terminated within any given cell site, could some percentage below full capacity constitute congestive RAN failure for purposes of reporting? For congested cell sites, should the usual methods for calculating the total number of customers affected be used, or should some account be taken of the fact that more than the usual number are trying to use the towers during these periods?

3. Costs of Reporting of Call Failures

181. In the *Notice*, we estimated that under our proposal for reporting of widespread call failures in wireless RANs, providers would need to file approximately 420 reports per year, thus increasing their annual reporting costs by \$67,200.⁴³² We based this estimate on the assumption that wireless networks and interoffice networks are engineered to achieve comparably low rates of call failure and would have a comparable rate of calls blocked.⁴³³

182. We seek further comment on the specific costs to implement some type of reporting on call failures in both the RAN and the local access network. With regard to the RAN, CCA disagrees with

⁴³¹ *Notice*, 30 FCC Rcd at 3211, para. 14-15; n. 21 (noting that mass calling events were observed in the aftermath of the derecho storm of 2012 and the Boston Marathon bombings in 2013).

⁴³² *Notice*, 30 FCC Rcd at 3212, para. 17.

⁴³³ *Id.*

an assumption in the *Notice* that providers are already technically capable of tracking call failures at each cell site, asserting that some of its members “do not currently collect and preserve this information in an ongoing manner.”⁴³⁴ We seek more specific information about the data that providers already have about call failures and the costs of adding equipment to track call failures at cell sites. To what extent do providers already track call failures in the RAN and the local access network?⁴³⁵ What other parameters do operators use to determine when new towers or equipment must be installed to meet increasing demand? Commenters should be specific as to the information that their networks can track. Commenters should be specific and realistic in their costs estimates as well.

183. Moreover, we ask if some type of delayed implementation or exemption for smaller and/or rural providers would be helpful, particularly given that we expect network overloading is less likely to be an issue in rural areas. If we were to delay implementation of this type of reporting for a certain subset of providers, what would be a reasonable amount of time? What definition of smaller and/or rural carrier would be most appropriate?

E. Geography-based Wireless Outage Reporting

1. Background

184. In the *2015 Part 4 Notice*, we sought comment on a separate and additional wireless outage reporting requirement based on the geographical scope of an outage, irrespective of the number of users potentially affected.⁴³⁶ Wireless outages that may not meet our 900,000 user-minute threshold but cover large geographic areas may be important because wireless service may be the only option in many areas, particularly as the percentage of calls to 911 from wireless devices continues to increase. It may be possible that large geographic areas are regularly losing service, but we are not aware of them (other than by press reports) because they do not meet the 900,000 user-minute threshold. Nonetheless, these outages are especially important to areas where service (wireless or otherwise) is minimal, and when an outage occurs, those in an emergency would have to travel far to make a 911 call.

185. Comments on this issue following the *Notice* were mixed. On one hand, APCO and CPUC see value in this type of outage reporting.⁴³⁷ NACo acknowledges that it would be helpful to have data on wireless outages in rural areas, but expresses concern that additional geographic outage reporting may discourage carriers from adding wireless service in sparsely populated areas and that the costs of such reporting may be passed on to consumers.⁴³⁸ On the other hand, several providers and trade associations oppose an additional wireless outage reporting requirement based on the geographical scope of an outage.⁴³⁹ Some misunderstand the rationale behind our proposal. For example, some commenters note that NORS (and DIRS) already contain a geographic component.⁴⁴⁰ While this is true, it does not account for situations where an outage affects a large geographic area but the reporting threshold is not met. ATIS argues that our proposal would likely increase duplicative reports since many of the outages

⁴³⁴ CCA Comments at 2.

⁴³⁵ Some commenters suggest that the Commission is already receiving this information in the *Rural Call Completion* proceeding. See, e.g., XO Comments at 3 (citing *Rural Call Completion*, Report and Order and Notice of Proposed Rulemaking, XX FCC Rcd 3764 (2013); *Rural Call Completion*, Order on Reconsideration, 29 FCC Rcd 14096 (2014)); CenturyLink Reply at 11. We note, however, that data from that proceeding involve the terminating access end of the network; here, we address the originating access end of the network.

⁴³⁶ *2015 Part 4 Notice* at 3218, paras. 34-35.

⁴³⁷ APCO Comments at 4; CPUC Reply at 10; CPUC August 21, 2015, Ex Parte.

⁴³⁸ NACo August 7, 2015, Ex Parte.

⁴³⁹ ATIS Comments at 9; AT&T Reply at 10; NTCA Reply at 8; Sprint Comments at 8; Verizon Comments at 9.

⁴⁴⁰ Sprint Comments at 8; Verizon Comments at 9.

would already meet the 900,000 user-minute threshold.⁴⁴¹ Sprint asserts that this type of reporting would not provide meaningful data on outages that impact a significant amount of people.⁴⁴² These arguments, however, miss the point that certain rural or otherwise low population areas may be experiencing persistent wireless outages that affect large geographic areas but are never reported because they fail to reach the 900,000 user-minute threshold. APCO suggests that any outage covering 1/3 of a county or PSAP service area should be reported, regardless of the number of users potentially affected.⁴⁴³ CPUC likewise believes that any requirement based on the geographic scope of an outage should not be contingent on the number of users affected.⁴⁴⁴ AT&T argues that using county boundaries would be administratively burdensome because providers would have to map serving areas, something that is particularly difficult with wireless networks where coverage can be changed to accommodate outages. Verizon opposes using percentage of service area.⁴⁴⁵

2. Proposed Rule

186. We propose to amend the part 4 reporting requirements to include wireless outages significantly affecting rural areas. We seek comment on this proposal. Specifically, we propose to require a wireless provider serving a rural area to file outage reports whenever one-third or more of its macro cell sites⁴⁴⁶ serving that area are disabled such that communications services cannot be handled through those sites, or are substantially impaired due to the outage(s) or other disruptions affecting those sites. We seek comment on, alternatively, requiring such reporting upon the disabling of one-half of the macro cell sites in the rural area. In regard to the definition of “rural area,” while the Communications Act does not include a statutory definition of what constitutes a rural area,⁴⁴⁷ the Commission has used a “baseline” definition of rural as a county with a population density of 100 persons or fewer per square mile.⁴⁴⁸ We propose to use this same definition for purposes of determining wireless outages affecting

⁴⁴¹ ATIS Comments at 9.

⁴⁴² Sprint Comments at 8.

⁴⁴³ APCO Comments at 4.

⁴⁴⁴ CPUC Reply at 11.

⁴⁴⁵ Verizon Comments at 9.

⁴⁴⁶ *See supra* para. 34, n. 108.

⁴⁴⁷ The federal government has multiple ways of defining rural, reflecting the multiple purposes for which the definitions are used. *See Eighth Report*, 18 FCC Rcd at 14834; *Facilitating the Provision of Spectrum-Based Service to Rural Areas and Promoting Opportunities for Rural Telephone Companies to Provide Spectrum-Based Services*, *See also Notice of Proposed Rulemaking*, 18 FCC Rcd 20802, 20808-11 (2003). The Commission has used Rural Services Areas (RSAs) as a proxy for rural areas for certain purposes, such as the former cellular cross-interest rule and the former CMRS spectrum cap, stating that “other market designations used by the Commission for CMRS, such as [EAs], combine urbanized and rural areas, while MSAs and RSAs are defined expressly to distinguish between rural and urban areas.” *See* 1998 Biennial Regulatory Review, *Spectrum Aggregation Limits for Wireless Telecommunications Carriers*, *Report and Order*, 15 FCC Rcd 9219, 9256, para. 84, n.203 (1999).

⁴⁴⁸ *Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum-Based Services*, *Report and Order*, 19 FCC Rcd 19078, 19087-88 (2004) (“We recognize, however, that the application of a single, comprehensive definition for ‘rural area’ may not be appropriate for all purposes. . . . Rather than establish the 100 persons per square mile or less designation as a uniform definition to be applied in all cases, we instead believe that it is more appropriate to treat this definition as a presumption that will apply for current or future Commission wireless radio service rules, policies and analyses for which the term ‘rural area’ has not been expressly defined. By doing so, we maintain continuity with respect to existing definitions of ‘rural’ that have been tailored to apply to specific policies, while also providing a practical guideline”). *See also* *Updating Part 1 Competitive Bidding Rules, Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, *Petition of DIRECTV Group, Inc. and EchoStar LLC for Expedited Rulemaking to Amend Section 1.2105(a)(2)(xi) and 1.2106(a) of the Commission’s Rules and/or for Interim Conditional Waiver, Implementation of the Commercial Spectrum Enhancement Act and Modernization of the*

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predominantly rural areas. We ask, however, whether other alternative definitions might be of better use in aiding our visibility into rural-specific outages. For example, should we focus on areas designated for the Universal Service Mobility Fund support?⁴⁴⁹ Are there other rural area designation tools or proxies that should be considered (e.g., defining areas by rural exchange operating carrier designations – OCNs)? We seek comment on these questions and proposals.

187. Is there a geographic area designation other than “rural area,” as defined above, that aligns better with the way wireless providers measure their own service? For example, is there a subset of any licensed service area (e.g., Cellular Market Area) that wireless carriers could more easily use to identify outages in predominantly rural areas? Or, would the use of zip codes, such as when one hundred percent of a zip code is impacted be an appropriate measurement? Also, we seek comment on whether an outage of at least one-third, or one-half, of cell sites within the rural area would indicate an outage that would be of a nature that it substantially affects wireless coverage for a large geographic area.

188. We recognize that this issue may become less critical as wireless providers begin to comply with the new standardized method, adopted in the above Report and Order, for calculating the number of potentially affected users during a wireless outage. By using a national average to determine the potentially affected users per site, will adoption and implementation of this new formula for the number of potentially-affected users increase the reporting of outages in low population areas? We also seek comment on alternative measurements for outages in rural areas. For example, could we adopt a lower user-minute threshold for rural areas to increase the reporting of events affecting rural communities? For example, would a threshold of 300,000 user-minutes in rural areas increase our chances of receiving information on outages that affect rural communities? Conversely, for example, would clear geographic criteria, such as a county-based threshold, for wireless outage reporting simplify the M2M rules for automated outage reporting and eliminate the need for manual interpretations of thresholds?

3. Costs of Reporting of Geography-based Wireless Outages

189. In the *Notice*, we estimated that adoption of a geography-based outage reporting requirement would result in the filing of an additional 1,841 reports per year, thereby increasing reporting costs by \$294,560 (i.e., 1,841 reports x \$160 staff costs per report).⁴⁵⁰ To reach this estimate, we subtracted the number of additional outage reports that would be generated by geography-based reporting from the number of reports that would be submitted for outages that meet the current 900,000 user-minute threshold.⁴⁵¹

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Commission’s Competitive Bidding Rules and Procedures, *Report and Order, Order on Reconsideration of the First Report and Order, Third Order on Reconsideration of the Second Report and Order, Third Report and Order*, 30 FCC Rcd 7493, 7536-37, para. 104 (2015).

⁴⁴⁹ FCC, Mobility Fund Phase 1 Eligible Areas, <https://www.fcc.gov/reports-research/maps/mobility-fund-phase-1-eligible-areas> (last visited Apr. 28, 2016).

⁴⁵⁰ *Notice*, 30 FCC Rcd at 3218, para. 35.

⁴⁵¹ *Id.* We estimated that geography-based reporting would generate additional reports in counties where a wireless provider has fifteen or fewer cell sites. The number of counties with fifteen or fewer cell sites represents 2.7 percent of the total number of cell sites nationwide, based on analysis of data collected from companies given to the Commission during activations from the Disaster Information Reporting System (DIRS) in 2012. Using as a guide counties with fifteen or fewer cell sites, we calculated that a disruption to communications would be reportable under a geographic coverage standard if one or two cell sites in the county are down. Based on historical NORS data, we then estimated that each cell site has a 22.6 percent chance of experiencing an outage within a given year, and using CTIA’s estimate that 301,779 cell sites were in operation nationwide as of the end of 2012, we tentatively conclude that adoption of a geography-based reporting requirement would likely result in the filing of 1,841 additional reports per year ($301,779 \times 0.226 \times 0.027 \approx 1,841$), creating an estimate of \$294,560 cost burden. *Id.*

190. We seek further comment on the costs of implementing a new geography-based outage reporting requirement for wireless carriers. Sprint and Verizon argue that carriers would need to develop and deploy additional automation tools and monitoring mechanisms.⁴⁵² We estimate that, based on our proposal here, our estimate of 1,841 additional reports per year from the *Notice* will be the same. We seek further comment on a way in which we could capture outages affecting large geographic areas without being overly burdensome for providers. If, for example, we were to adopt an outage reporting requirement when 33 percent of cell sites become disabled within a county, would such a calculation require additional tools or monitoring mechanisms? We assume carriers would already know when (and why) their cell sites become disabled, and would know the number of cell sites per county. Therefore, we believe it would be a relatively easy and inexpensive calculation for providers to determine if a certain threshold of cell sites in a county have become disabled. Is one-third (33 percent) the appropriate threshold?

191. NTCA comments that the burden would be greater on smaller carriers, where the failure of one tower may trigger a reporting obligation.⁴⁵³ While we could consider some type of exemption for smaller carriers, we believe smaller and rural carriers cover precisely the areas targeted by this proposal. Therefore, we do not propose to exempt any carriers. We seek comment on this approach.

F. Refining the Definition of ‘Critical Communications’ at Airports

192. Commercial aviation increasingly depends on information systems that are not collocated with airport facilities, and that may carry critical information. We seek comment on requiring reporting of outages affecting critical aviation information facilities that are not airport-based, either as a function of their status as TSP Level 3 or 4 facilities,⁴⁵⁴ or upon some other basis. In particular, we seek comment on whether it is correct to assume that some information systems critical to safe commercial aviation are not located within an airport’s facility. If the assumption is accurate, we invite discussion of the architecture of such external systems, including the safeguards currently established for those systems. Were the Commission to explore outage reporting requirements for these systems and facilities, what reporting criteria should it establish? For outage reporting purposes, should the Commission distinguish between facilities enrolled in the TSP program and those facilities that are not? If so, on what basis should the different treatment be premised? What, if any, additional costs might be associated with expanding the reporting obligation to such facilities, whether or not enrolled in TSP?

G. Legal Authority

193. The Commission’s authority to establish outage reporting requirements from a wide range of communications providers is well-established under a wide range of statutory provisions.⁴⁵⁵ We seek comment on the application of these specific authorities to our proposals, as further outlined and discussed below.

⁴⁵² Sprint Comments at 8; Verizon Comments at 9 (specifically stating considerable IT costs if providers had to determine outages based on a percentage of advertised coverage area).

⁴⁵³ NTCA Reply at 8.

⁴⁵⁴ Facilities are eligible for TSP Level 3 or 4 prioritization if they (3) support public health, safety, and maintenance of law and order activities or (4) maintains the public welfare and the national economic system. *See* U.S. Department of Homeland Security, TSP Eligibility, <http://www.dhs.gov/tsp-eligibility> (last visited May 2, 2016).

⁴⁵⁵ *See, e.g., 2012 Part 4 Order*, 27 FCC Rcd at 2673-79, paras. 58-67; *2004 Part 4 Order*, 19 FCC Rcd at 16837-38, 16848-49, 16855, paras. 12, 32, 45, nn. 13-16, 102, 138; *911 Reliability Order*, 28 FCC Rcd at ____ ; *Amendment of Part 64 of the Commission’s Rules to Provide for a New Priority System for the Restoration of Common Carrier Provided Intercity Private Line Service*, Final Order, 81 FCC 2d 441, para. 7 (1980).

1. 911 and Emergency Communications

a. Transition to Next Generation 911

194. Following the evolution in the country's commercial communications networks, the nation's emergency communications systems are in the process of a critical transition from legacy systems using time-division multiplex (TDM)-based technologies to Next Generation 911 (NG911) systems that utilize IP-based technologies. NG911 will serve as a platform for enabling more effective communications between the public and public safety, including both 911 call-takers and first responders. It has the potential to reduce costs for public safety agencies, offer more dynamic and accurate call routing, provide improved resiliency and accessibility, and allow PSAPs to receive a much wider variety of data such as video, text, and medical information. Eventually, NG911 systems will replace legacy 911 systems, and are already doing so, but some jurisdictions are able to implement NG911 systems and applications at a much faster pace than others. As noted by NENA in a recent filing in the Commission's *911 Governance* proceeding, "it is critically important that the reliability of 911 systems and services be ensuring during this transitional period and beyond."⁴⁵⁶

195. As a result of this transition, the nation's 911 system will increasingly include the BIAS and dedicated services,⁴⁵⁷ which will support a new generation of 911 call services that may be vulnerable to a similarly new generation of disruptions that may not have existed on legacy 911 networks. For example, services may come in from BIAS consumer endpoints, but PSAP or ESINet access to and communications between regional and national 911 databases is supported by dedicated services. If an ESINet rides over a commercial broadband network and there is an outage, the outage will impact not only access to the centralized services on the ESINet, but also each PSAP's ability to transfer calls and otherwise communicate with other PSAPs on the ESINet. Indeed, as NG911 services are increasingly provisioned through broadband network elements, disruptions to broadband could impact the provision and reliability of local 911 voice and other shared services essential to emergency response.⁴⁵⁸ Although ESINet implementation is far from consistent across the United States, it is clear that these network configurations are growing in number and will continue to do so as jurisdictions migrate to NG911.⁴⁵⁹

⁴⁵⁶ NENA *Ex Parte* in PS Docket Nos. 13-75 and 14-193 (Jan. 29, 2016) at 3.

⁴⁵⁷ See, e.g., L.R. Kimball as prepared for Ohio Department of Administrative Services, Report for ESINet Technical Requirements at 7, (Nov. 2013) <http://911.ohio.gov/Portals/0/ESINet%20Steering%20Committee/RPT131125%20skw%20Ohio%20ESINet%20Technical%20and%20Operational%20Requirements%20FINAL.pdf> (describing how a state ESINet would be using its own backbone network to support emergency communications for and between all PSAPs on the ESINet).

⁴⁵⁸ See FCC, Task Force on Optimal PSAP Architecture Final Report at 216 (2015), <https://www.fcc.gov/about-fcc/advisory-committees/general/task-force-optimal-public-safety-answering-point>. The policy routing function is defined as "that functional component of an Emergency Services Routing Proxy that determines the next hop in the SIP signaling path using the policy of the nominal next element determined by querying the ECRF with the location of the caller; a database function that analyzes and applies ESINet or PSAP state elements to route calls, based on policy information associated with the next hop." See also Intrado, "Next Gen 9-1-1: The Essential Guide to Getting Started," <https://www.intrado.com/sites/default/files/documents/NextGen%209-1-1%20The%20Essential%20Guide%20to%20Getting%20Started.pdf> (last visited May 25, 2016). Intrado notes that the "innate and remote redundancy of a cloud-based system offers simplified and improved operational continuity when an emergency event threatens the physical structure of a PSAP." This increases the need for a reliable and secure infrastructure providing end-to-end communications.

⁴⁵⁹ See FCC, Seventh Annual Report to Congress on State Collection and Distribution of 911 and Enhanced 911 Fees and Charges at 77-78 and Table 20 (2015), https://transition.fcc.gov/pshs/911/Net%20911/NET911_Act_7thReport_to_Congress_123115.pdf (noting eleven states with statewide ESINets, eleven states with regional ESINets, and seven states with local ESINets). See also AT&T Product Brief, "AT&T ESINet: Next Generation 9-1-1 Call Routing," http://www.corp.att.com/stateandlocal/docs/Next_Gen_911_Call_Routing-022916.pdf (last visited May 25, 2016).

Accordingly, we believe that monitoring the resiliency of broadband networks supporting that communication is vital to ensure the reliable availability and functionality of 911 services.⁴⁶⁰

196. Regarding our proposal to update the outage reporting rules for interconnected VoIP service providers, section 615a-1⁴⁶¹ instructs the Commission to “take into account any technical, network security, or information privacy requirements that are specific to IP-enabled voice services” and to update regulations “as necessitated by changes in the market or technology, to ensure the ability of an IP-enabled voice service provider to comply with its obligations.”⁴⁶² The proposed reporting process seeks to modernize the outage reporting system in light of technology advances and greater consumer adoption of interconnected VoIP service, considering the potential for degradations of service to impact 911 call completion. We seek comment on how section 615a-1 provides authority to adopt such proposals with respect to interconnected VoIP.⁴⁶³

197. We also believe that our proposals to extend outage reporting to the classes of broadband providers and services described in this Further Notice are authorized by or reasonably ancillary to our statutorily mandated responsibility under section 615a-1 to ensure that “IP-enabled voice service provider[s] provide 9-1-1 service and enhanced 9-1-1 service.”⁴⁶⁴ As noted above, broadband services are now and will continue to be key for delivery of 911 call information (including not only voice but also data and video) from the end-user to a PSAP. Therefore, to ensure broadband-enabled voice service providers comply with their 911 obligations,⁴⁶⁵ we seek comment on how our proposals better equip the Commission to meet its section 615a-1 mandates. Moreover, in light of our obligation to identify capabilities necessary to support 911 and E911 service for interconnected VoIP,⁴⁶⁶ how would our proposals here enable us to determine if there are capabilities currently not captured by our rules? We seek comment on whether networks, facilities, databases or other components to the extent these are elements that support a “seamless transmission, delivery, and completion of 911 and E-911 calls and associated E-911 information”⁴⁶⁷ have changed sufficiently to warrant further consideration, or because “critical components of the 911 infrastructure may reside with an incumbent carrier, a PSAP, or some other entity.”⁴⁶⁸ How should the Commission analyze these considerations in our section 615a-1 analysis? In addition, we seek comment as to whether these proposals are authorized by or reasonably ancillary to our statutory mandates to develop best practices that promote consistency and appropriate procedures for defining network diversity requirements for IP-enabled 911 and E911 call delivery.⁴⁶⁹

b. Ensuring Reliable Access to 911 by the Disabled

198. Additionally, under the Twenty-First Century Communications and Video Accessibility Act of 2010 (CVAA),⁴⁷⁰ the Commission may “promulgate regulations to implement the

⁴⁶⁰ See *Multistate Report* at para. 12 (describing how consolidation of services resulted in overdependence on certain network elements, which ultimately led to the multi-state outage).

⁴⁶¹ *NET 911 Improvement Act* at § 6(b) (codified at 47 U.S.C. § 615a-1).

⁴⁶² 47 U.S.C. § 615a-1(c)(3).

⁴⁶³ 47 U.S.C. § 615a-1(a).

⁴⁶⁴ 47 U.S.C. § 615a-1(a).

⁴⁶⁵ See *id.* § 615a-1(c)(3).

⁴⁶⁶ 47 U.S.C. § 615a-1(6)(c).

⁴⁶⁷ H. Rep. 110-442, 14 (2008).

⁴⁶⁸ H. Rep. 110-442, 14 (2008).

⁴⁶⁹ 47 U.S.C. § 615a-1(h).

⁴⁷⁰ Twenty-First Century Communications and Video Accessibility Act of 2010, Pub. L. No. 111-260, 124 Stat. 2751 (2010) (codified in various sections of Title 47 of the United States Code) (“CVAA”) (providing that “[t]he

recommendations proposed by the [Emergency Access Advisory Committee (EAAC)], as well as any other regulations, technical standards, protocols, and procedures as are necessary to achieve reliable, interoperable communication that ensures access by individuals with disabilities to an Internet protocol-enabled emergency network, where achievable and technically feasible.”⁴⁷¹ The CVAA has served as the basis for Commission actions with respect to text-to-911⁴⁷² and 911 relay services,⁴⁷³ and we now seek comment on the application of the CVAA to our proposed disruption reporting rules for broadband.

199. In this vein, the EAAC has recommended that the Commission “issue regulations as necessary to require that target entities, in the development and deployment of NG9-1-1 systems, take appropriate steps to support features, functions and capabilities to enable individuals with disabilities to make multimedia NG9-1-1 emergency calls.”⁴⁷⁴ The EAAC enumerated a list of goals for the Commission related to 911 accessibility, including enabling consumers to call 911 using different forms of data, text, video, voice, and/or captioned telephony individually or any combination thereof; ensuring direct access to 911 using IP-based text communications (including real-time text, IM, and email); and facilitating the use of video multimedia calls into a PSAP.⁴⁷⁵ The EAAC also recommended that users have the option to call 911 via voice or text service, as well as video and any other emerging technology; that is, callers should be able to access 911 using both old and new communications services – something that a single broadband network can support.⁴⁷⁶ We note that these technologies are commonly supported by broadband networks, and to ensure access to 911 for individuals with disabilities, the Commission must be able to assess how those technologies are performing. The EAAC also made clear that its recommendations should evolve with the technology.⁴⁷⁷ Perhaps most importantly, the EAAC recommended that the Commission “adopt requirements that ensure that the quality of video, text and voice communications is sufficient to provide usability and accessibility to individuals with disabilities based on industry standards for the environment.”⁴⁷⁸

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Commission shall have the authority to promulgate regulations to implement the recommendations proposed by the Advisory Committee, as well as any other regulations, technical standards, protocols, and procedures as are necessary to achieve reliable, interoperable communication that ensures access by individuals with disabilities to an Internet protocol-enabled emergency network, where achievable and technically feasible.”).

⁴⁷¹ The Emergency Access Advisory Committee (EAAC) is an advisory committee created by the CVAA, to determine the most effective and efficient technologies and methods to enable access to Next Generation 911 emergency services by individuals with disabilities. See 47 U.S.C. § 615c; see also generally EAAC, Report on Emergency Calling for Persons with Disabilities Survey Review and Analysis 2011 (2011), <http://transition.fcc.gov/cgb/dro/EAAC/EAAC-REPORT.pdf> (EAAC Final Report).

⁴⁷² See *Facilitating the Deployment of Text-to-911 & Other Next Generation 911 Applications*, Report and Order, 28 FCC Rcd 7556, 7592-600 at paras. 100-27 (2013); *Facilitating the Deployment of Text-to-911 & Other Next Generation 911 Applications*, Second Report and Order, 29 FCC Rcd 9846, 9878-80 at paras. 71-78 (2014).

⁴⁷³ See, e.g., *Contributions to the Telecommunications Relay Service Fund, Report and Order*, 26 FCC Rcd 14532 (2011) (requiring interconnected VoIP providers contribute to the TRS fund); *Implementation of the Twenty-First Century Commc'ns & Video Accessibility Act of 2010, Section 105, Relay Servs. for Deaf-Blind Individuals*, Report and Order, 26 FCC Rcd 5640, 5641 (2011) (establishing a National Deaf-Blind Equipment Distribution Program).

⁴⁷⁴ EAAC Final Report at Recommendation P1.1.

⁴⁷⁵ EAAC Final Report at Recommendation P2.2.

⁴⁷⁶ EAAC Final Report at Recommendation P2.2 (11), (16), and (18). See also *supra* Section V.B.

⁴⁷⁷ EAAC Report at 18 (“The EAAC intends that these recommendations ensure access to emergency communications services for individuals with disabilities consistent with access to such services for all citizens. Since the NG9-1-1 regulatory and operational framework continues to develop, these recommendations are intended to apply prospectively to equipment or services consistent with future NG9-1-1 obligations, subject to the FCC’s notice and comment rulemaking procedures.”).

⁴⁷⁸ EAAC Final Report at Recommendation P2.3.

200. Given that video, text, and voice communications to 911 already traverse broadband networks and will continue to do so as the deployment of Real-Time Text⁴⁷⁹ and other NG911 multimedia applications grows, we believe that the CVAA's mandate for ensuring equal access to 911 provides an additional legal basis for the broadband reporting rules proposed herein. We seek comment on this tentative conclusion. Is disruption reporting the optimal mechanism for the Commission to the quality of video, text and voice communications is sufficient to provide usability and accessibility to individuals with disabilities? Are there alternative measures the Commission could take to ensure broadband network availability for non-traditional 911 calls (i.e., 911 text messages or relay calls)? We believe the proposed reporting requirements are an "achievable and technically feasible" way to ensure access to 911 for the deaf and hard of hearing, as required under the CVAA, and we seek comment on this approach.

2. Title II

201. The Commission has classified BIAS and dedicated services as telecommunications services under Title II of the Act.⁴⁸⁰ As such, we tentatively conclude that the Commission has ample authority under Title II to support the outage reporting requirements proposed in this Further Notice.⁴⁸¹ We seek comment on this tentative conclusion, and on the relevance of sections 201, 202, 214, 218, and any other provisions of Title II for supporting the outage reporting requirements proposed here for BIAS and dedicated services.

As we observed in the *2015 Open Internet Order*, section 201 imposes a duty "on common carriers to furnish communications services subject to Title II 'upon reasonable request,'" and to ensure that their practices are "just and reasonable."⁴⁸² We also noted that the general conduct standard "represents our interpretation of sections 201 and 202 in the broadband Internet access context."⁴⁸³ We seek comment on the interplay between the *2015 Open Internet Order* and the Commission's authority under section 201 to "prescribe rules and regulations as may be necessary in the public interest to carry out the provisions of this chapter", as such authority relates to BIAS.⁴⁸⁴ We also seek comment generally on other provisions of Title II and legal

⁴⁷⁹ Real-Time Text (RTT) transmits text instantly, allowing each text character to appear on the receiving device at roughly the same time it is typed on the sending device. Emergency Access Advisory Committee (EAAC), Report on TTY Transition at 6 (2013), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-319386A1.doc. The Commission recently granted waivers to both AT&T and Verizon, permitting them to move forward on RTT pilot projects that, in some instances, would violate the Commission's legacy TTY rules in 47 CFR § 20.18(c). See *Petition for Waiver of Rules Requiring Support of TTY Technology*, Order, 30 FCC Rcd 10855 (CGB PSHSB WTB WCB 2015); *Petition for Waiver of Rules Requiring Support of TTY Technology*, Order, 30 FCC Rcd 12755 (CGB PSHSB WTB WCB 2015).

⁴⁸⁰ See *2015 Open Internet Order*, 30 FCC Rcd at 5724-25, para. 283-84 ("BIAS is a telecommunications service"); *Business Data Services FNPRM*, FCC 16-54 at para. 257, n.672 ("BDS providers . . . meet[] the definition of a 'telecommunications service' . . . and subject to Title II"). (citing *NARUC I*, 525 F.2d 630, 641 (D.C. Cir. 1976) ("It is not necessary that a carrier be required to serve all indiscriminately; it is enough that its practice is, in fact, to do so.)); 47 U.S.C. § 153(53).

⁴⁸¹ See 47 U.S.C. §§ 201(a), 214, 218; *2015 Open Internet Order*, 30 FCC Rcd at 5724-25 paras. 283-84. Dedicated services, which transmit, data from user to user without change in the form or content of the information sent or received, is thus a "telecommunications service" under Section 3 of the Act's definition. See 47 U.S.C. § 153(46); see also *2004 Part 4 Order*, 19 FCC Rcd at 16894-5, 16899, paras. 127, 136 (discussing "special services" and "communication highway" for DS3s and DS0s) and at 16837-41, paras. 12-18 (discussing statutory framework for legacy reporting).

⁴⁸² *2015 Open Internet Order*, 30 FCC Rcd at 5724-25, para. 284 (quoting 47 U.S.C. § 201(a) and 201(b)).

⁴⁸³ *Id.* At 5660, para. 137; see *id.* at 5729, para. 295.

⁴⁸⁴ 47 U.S.C. § 201(b).

theories under those provisions to support outage reporting in the dedicated services and BIAS contexts.⁴⁸⁵

3. Title III

202. With respect to the rules proposed herein for wireless voice and broadband providers, we believe the Commission has further legal authority to support the rules proposed herein under Title III of the Communications Act.⁴⁸⁶ The Supreme Court has long recognized that Title III grants the Commission “expansive powers” and a “comprehensive mandate” to regulate the use of spectrum in the public interest.⁴⁸⁷

203. We believe that sections 303(b) and (r)⁴⁸⁸ and 316⁴⁸⁹ provide the Commission with authority to apply outage reporting requirements to mobile BIAS and dedicated services providers and to CMRS providers in instances of call failures in the radio access network.⁴⁹⁰ We seek comment on this view.

204. For example, section 303(b) authorizes the Commission to “[p]rescribe the nature of the service to be rendered by each class of licensed stations and each station within any class.”⁴⁹¹ Addressing the scope of this provision in *Cellco*,⁴⁹² the D.C. Circuit recognized that section 303(b) authorizes the Commission to “lay[] down a rule about ‘the nature of the service to be rendered’ by entities licensed” by the Commission.⁴⁹³ The court further explained that, while a provider may choose not to offer a wireless service, section 303(b) authorizes the Commission to “define[] the form” that the “service must take for those who seek a license to offer it.”⁴⁹⁴

205. We also believe section 316 authorizes the Commission to impose new conditions on

⁴⁸⁵ Although the Commission ordered, *sua sponte*, forbearance with respect to a wide variety of regulations in *2015 Open Internet Order*, Part 4 requirements did not fall within the scope of forbore Title II regulations. *2015 Open Internet Order*, 30 FCC Rcd. at 5616-18.

⁴⁸⁶ See 47 U.S.C. § 301 *et seq.*

⁴⁸⁷ *Nat’l Broad. Co. v. United States*, 319 U.S. 190, 219 (1943) (recognizing the FCC’s “expansive powers” and “comprehensive mandate”); see also Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, *Second Report and Order*, 26 FCC Rcd 5411, 5439-5443 (¶¶ 61-64) (2011) (discussing the scope of the Commission’s Title III authority) (“*Data Roaming Order*”), *petition for review denied Cellco Partnership v. FCC*, 700 F.3d 534 (D.C. Cir. 2012) (upholding the FCC’s authority to rely on Title III provisions to impose the data roaming rule).

⁴⁸⁸ 47 U.S.C. § 303(b) (authorizing the Commission to “[p]rescribe the nature of the service to be rendered by each class of licensed stations and each station within any class”); 47 U.S.C. § 303(r) (the Commission may “prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of this [Act]”).

⁴⁸⁹ 47 U.S.C. § 316(a) (authorizing the Commission to modify existing licenses to impose new license conditions if, in the judgment of the Commission, such action will promote the public interest, convenience and necessity).

⁴⁹⁰ See *supra* Sections B (Broadband Network Outage Reporting), D (Call Failures in Radio and Local Access Networks), and E (Geography-based Wireless Outage Reporting).

⁴⁹¹ 47 U.S.C. § 303(b); see also *Schurz Communications, Inc. v. FCC*, 982 F.2d 1043, 1048 (7th Cir. 1992) (stating that the Communications Act invests Commission with “enormous discretion” in promulgating licensee obligations that the agency determines will serve the public interest).

⁴⁹² *Cellco*, 700 F.3d at 541-44.

⁴⁹³ *Id.* (quoting 47 U.S.C. § 303(b)). In reaching this conclusion, the court referenced the definition of the word “prescribe,” which the court stated means, among other things, “to lay down a rule.” *Cellco*, 700 F.3d at 542 (quoting Webster’s Third New International Dictionary 1792 (1993)).

⁴⁹⁴ *Cellco*, 700 F.3d at 543.

existing licenses if we think such action “will promote the public interest, convenience, and necessity.”⁴⁹⁵ The D.C. Circuit has recognized as “undisputed that the Commission always retain[s] the power to alter the term of existing licenses by rulemaking.”⁴⁹⁶ Accordingly, we believe that the outage reporting requirements proposed here for mobile service providers of BIAS or dedicated services, as conditions imposed on existing licenses, fall within the Commission’s section 316 authority, and we seek comment on this view.

4. Section 706 of the Telecommunications Act

206. It is the established policy of the United States to “promote the continued development of the Internet and other interactive computer services and other interactive media . . . [and] to encourage the development of technologies which maximize user control over what information is received by individuals, families, and schools who use the Internet and other interactive computer services.”⁴⁹⁷ Furthering this policy, in 1996 Congress adopted section 706 of the Telecommunications Act of 1996, which instructs the Commission to “encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans,” and further provides if the Commission finds advanced telecommunications capability is not being deployed on a reasonable and timely basis, it must “take immediate action to accelerate deployment of such capability.”⁴⁹⁸ Advanced telecommunications capability, as defined in the statute, includes a subset of broadband Internet access.⁴⁹⁹ Thus, under section 706(b), the Commission conducts an annual inquiry as to whether advanced telecommunications capability is being deployed to all Americans on a reasonable and timely basis.

207. We seek comment on the contours of section 706 as the basis for broadband-related outage reporting under part 4. We believe broadband network reliability, resiliency, and security are germane to the Commission’s effort to achieve section 706’s policy objectives. Mandatory outage reporting could provide the Commission with a dependable stream of objective data to further inform its annual inquiry under section 706. We seek comment on the value of the proposed broadband outage reporting to our annual section 706 inquiry, and on our more general view that such disruption and outage data may aid the Commission’s efforts to ensure the deployment of advanced telecommunications capabilities to all Americans.

208. Further, the *2016 Broadband Progress Report* found that advanced telecommunications capability is not being deployed to all Americans in a reasonable and timely fashion,⁵⁰⁰ requiring the Commission to take immediate action to accelerate broadband deployment by removing barriers to

⁴⁹⁵ 47 U.S.C. § 316; *see also Cellco*, 700 F.3d at 543-44 (identifying Section 316 as another Title III provision that supported the FCC’s exercise of authority); *see also Celtronix Telemetry, Inc. v. FCC*, 272 F.3d 585 (D.C. Cir. 2001).

⁴⁹⁶ *Celtronix*, 272 F.3d at 589 (citing, *e.g.*, *United States v. Storer Broadcasting Co.*, 351 U.S. 192, 205 (1956)).

⁴⁹⁷ 47 U.S.C. § 230(b).

⁴⁹⁸ 47 U.S.C. § 1302(a), (b).

⁴⁹⁹ 47 U.S.C. § 1302(d)(1) (defining “advanced telecommunications capability” as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology”). *Cf.* *2015 Broadband Progress Report*, 30 FCC Rcd at 1376 para. 1 n.1 (“For simplicity . . . we sometimes refer to ‘advanced telecommunications capability’ as ‘broadband,’ but we note that “advanced telecommunications capability” has a unique definition in section 706 that differs from the term “broadband” in other contexts.”); *National Broadband Plan for Our Future*, Notice of Inquiry, 24 FCC Rcd 4342, 4309, App. para. 13 (2009) (“advanced telecommunications capability” includes broadband Internet access).

⁵⁰⁰ Federal Communications Commission, *2016 Broadband Progress Report*, 31 FCC Rcd 699, 700, para. 1 (2016) http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0129/FCC-16-6A1.pdf (*2016 Broadband Progress Report*).

infrastructure investment and promoting competition.⁵⁰¹ We seek comment on whether broadband outage reporting would aid the Commission in its efforts to identify where infrastructure investment and effective competition may be lacking and thus enable the Commission to take steps to remove any barriers to infrastructure investment that may prevail or otherwise to promote competition in affected areas. For instance, we observed in the *2016 Broadband Progress Report* that there are indications of a “correlation between non-adoption of broadband and security and privacy concerns.”⁵⁰² We also have stated that “privacy and network security are among the factors that can affect the quality and reliability of broadband services,” and that “[c]ommunications security, integrity, and reliability must be maintained as providers transition to IP-supported networks.”⁵⁰³ Does the proposed disruption reporting facilitate the 706(b) mandate to take immediate action to accelerate broadband deployment by providing valuable information on broadband infrastructure and service vulnerabilities, risks and disruptions that dampen consumer adoption and, thus, dis-incent broadband investment and deployment? Would the proposed reporting guide us to remove barriers to infrastructure investment and promote competition? Would broadband reporting promote section 706’s goals by enabling us to view sustained availability over time, providing a comprehensive view of performance-related metrics data? Of long-term advanced capability deployment? Could the Commission use the proposed outage reporting to spot areas of decreased investment or barriers to competition that we might need to stimulate or remove?⁵⁰⁴ We seek comment on whether the reliability of broadband service and its underlying network infrastructure can advance section 706 availability goals as well as bring a real-time measure of the services that are available in a given area.⁵⁰⁵

5. Universal Service Fund Mandates under Section 254

209. In addition, we believe that the Commission’s universal service funding mandates, underlying principles and goals, as set forth in section 254 of the Act,⁵⁰⁶ authorize us to require

⁵⁰¹ 47 U.S.C. § 1302(b).

⁵⁰² *2016 Broadband Progress Report*, 31 FCC Rcd at 752, para. 126, n.351; *see also 2015 Broadband Progress Report*, 30 FCC Rcd at 1438, para. 104; *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Tenth Broadband Progress Notice of Inquiry, 29 FCC Rcd 9747, 9769, para. 47, n. 108 (2014).

⁵⁰³ *2015 Broadband Progress Report*, 30 FCC Rcd at 1438, para. 105.

⁵⁰⁴ *See, e.g., 2016 Broadband Progress Report*, 31 FCC Rcd at 700 para. 1 (Upon a data-supported finding, as it has made recently, that “advanced telecommunications capability is not being deployed to all Americans in a reasonable and timely fashion”, the Commission must “take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”) The Commission has a range of options in this regard, and recently observed that it “will continue working to remove barriers to infrastructure investment, in part by direct subsidies, and in part by identifying and helping to reduce potential obstacles to deployment, competition, and adoption – concepts that we continue to recognize are tightly linked.”).

⁵⁰⁵ For example, Form 477 supports section 706 goals through non-outage data submitted by providers on a semiannual basis. Although those collections facilitate section 706 availability driven considerations, we ask whether more granular data submitted in Part 4’s time intervals may be of additional value to the Commission in the execution of section 706’s mandates. We think that these insights can be added to our Broadband Progress Report analyses without compromising the objectives now achieved through Part 4’s confidentiality treatment (as further discussed below), and we seek comment on this view.

⁵⁰⁶ 47 U.S.C. § 254. *See also* 47 U.S.C. § 151 (Sections 254 and 1 operate dynamically to ensure an appropriately broad scope of Commission authority to promote and safeguard universal service. Thus, section 1, as a policy statement, “illuminates” section 254 which, in turn, “builds upon” Section 1. *Comcast*, 600 F.3d at 654. *See also Connect America Fund, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17684, para. 61 (2011) (“In the 1996 Act, Congress *built upon* that longstanding principle [of section 1] by enacting section 254.”) (emphasis added)).

broadband disruption and outage reporting, as proposed, where the data from such reports could promote, or provide assurance (e.g., of “maximum value”) to, the Commission’s universal service funding efforts under section 254. We seek comment on this observation and analysis.

210. Certain broadband providers receive significant federal universal service high-cost broadband funding support through the USF’s Connect America Fund (CAF) program.⁵⁰⁷ To the extent that covered broadband providers receive (or have received) such funding, it is logical to require a certain level of assurance in behalf of the end users who fund it.⁵⁰⁸ Accordingly, we tentatively conclude that such part 4 reporting is an appropriate assurance expectation from CAF recipients, and we seek comment on this tentative conclusion.

211. On that basis, we now ask how part 4 disruption reporting concerning the broadband services funded through CAF support can best be used to assure these services and infrastructure?⁵⁰⁹ Specifically, should such assurance measurements be sought through our part 4 disruption reporting, or through some other mechanism? How might the collection and analysis of CAF recipient outage information help inform our section 254-related considerations and assist us in achieving our universal service goals? Should the Commission adopt standards for network health to be made part of CAF funding considerations? If so, what mechanisms should be used by the Commission to effectuate that approach? Should the Commission, for example, condition CAF support on standards that take into account a provider’s network health as revealed through outage reporting?

212. *Section 4(o)*. As noted above, Section 4(o) states that “[f]or the purpose of obtaining maximum effectiveness from the use of radio and wire communications in connection with safety of life and property, the Commission shall investigate and study all phases of the problem and the best methods of obtaining the cooperation and coordination of these systems.”⁵¹⁰ We believe that in order for the Commission to fulfill this mandate in today’s transitioning world and beyond, it must be able to obtain relevant data – including BIAS and dedicated services outage reporting – to investigate and study all aspects of broadband communications. We also believe section 4(o) authorizes the Commission to gather broadband network outage data to help ensure NS/EP communications continue to obtain maximum effectiveness, e.g., to receive appropriate levels of priority, be delivered over robust and resilient infrastructure, and function as required. Indeed, we believe that the ability to collect information on major disruptions to broadband communications supporting NS/EP priority services is essential to the Commission in fulfilling its national security/defense assurance role under the Act.⁵¹¹ We seek comment on these views.

⁵⁰⁷ A common carrier designated as an eligible telecommunications carrier pursuant to section 214 of the Act is eligible to receive federal high-cost universal service support in accordance with section 254. 47 U.S.C. §§ 214(e), 254(e). See also 47 CFR §§ 54.308 (Broadband public interest obligations for recipients of high-cost support), 54.309 (Connect America Fund Phase II Public Interest Obligations).

⁵⁰⁸ See, e.g., *Lifeline and Link Up Reform and Modernization et al.*, Second Further Notice of Proposed Rulemaking, *et al.*, 30 FCC Rcd at 7827 paras. 14-16.

⁵⁰⁹ See *In re FCC 11-161*, 753 F.3d 1015, 1046 (10th Cir. 2014) (observing that “it is reasonable to conclude that Congress left a gap . . . for the FCC to determine and specify precisely how USF funds may or must be used” and concurring with the Commission’s argument that “carriers ‘that benefit from public investment in their networks must be subject to clearly defined obligations associated with the use of such funding.’”).

⁵¹⁰ 47 U.S.C. § 154(o).

⁵¹¹ See, e.g., *Technology Transitions Order*, 29 FCC Rcd 1433, 1446-50 (recognizing need to preserve essential NS/EP priority services, as well as the need to advance new IP-enabled NS/EP priority services to serve the emergency response community’s needs).

VI. ORDER ON RECONSIDERATION

A. Airport Reporting Requirements

213. In January 2005, in response to the *2004 Part 4 Order*, Sprint filed a petition requesting that, among other issues, the Commission “clarify that wireline carriers are only required to report outages affecting airports when such outages ‘disrupt[] 50% or more of the air traffic control lines or other FAA communications links’ as was the case under the previous outage reporting rules, *see* 47 CFR §63.100(a)(6).”⁵¹² Sprint argues that in adopting the new part 4 rules, “[t]he Commission did not mention, let alone justify, doing away with the section 63.100(a)(6) limitation that *carriers report only outages affecting the critical communications facilities serving airports*” and urges the Commission “to clarify that it had no intention of removing the section 63.100(a)(6) language from Part 4 that limits reporting of airport outages to disruptions in communications being carried over critical infrastructure serving such airports, i.e., air traffic control or other FAA communications links[,] and to restore such language to section 4.5 of the rules.”⁵¹³

214. As noted above,⁵¹⁴ reports in this category generally have involved communications outages within the retail sections of an airport. A strict interpretation of current section 4.5(c) – i.e. that “[a]ll outages that potentially affect communications for at least 30 minutes with any airport that qualifies as a ‘special office and facility’ . . . shall be reported,”⁵¹⁵ – would have required providers to report outages that were not mission-critical, and which could represent a financial and administrative burden on those providers, with virtually no public safety benefit or public policy goal. Therefore, we shall amend section 4.5(c) to clarify that carriers need only report disruptions of critical communications, which impact the airports covered by our rules. To the extent our decision today responds affirmatively to Sprint’s request, we grant its request for clarification, which will be reflected in our ordering clause.⁵¹⁶

B. Reporting Obligations of Satellite and Terrestrial Wireless Service Providers

215. In 2004, the Commission exempted satellite and terrestrial wireless communications providers from reporting outages potentially affecting airports, on the grounds that the critical communications infrastructure serving those airports was landline-based.⁵¹⁷ CTIA, Cingular Wireless, and Sprint filed petitions urging the Commission to exempt wireless providers from reporting outages pertaining to all other special offices and facilities,⁵¹⁸ positing that the rationale for excluding wireless carriers from outage reporting for airports, i.e., that critical communications were landline-based, applied as well to all special offices and facilities. In the *2015 Part 4 Notice*, we asked whether, in spite of the continued growth in the use of wireless networks, we should extend the satellite and terrestrial wireless exemption to all “special offices and facilities.”⁵¹⁹ CTIA and Sprint again urged that the exemption be extended. CTIA notes that, today as in 2004, wireless networks provide undifferentiated service to all end users, even with the growth of wireless telephone in the past decade. As a matter of practice, wireless providers do not assign dedicated access lines to specific end users, and therefore do not have dedicated

⁵¹² *Petition of Sprint Corporation* at 4-5 (filed Jan. 3, 2005) (Sprint Petition).

⁵¹³ Sprint Petition at 5 (emphasis added).

⁵¹⁴ *See supra*, Section IV.D.3, para. 73.

⁵¹⁵ 47 CFR §4.5(c).

⁵¹⁶ *See infra*, para. 228.

⁵¹⁷ *2004 Part 4 Order*, 19 FCC Rcd at 16867, para. 66; *see also* 47 CFR §§ 4.9(c)(2)(iii), (e)(4).

⁵¹⁸ CTIA Petition at 2-3; Cingular Petition at 4; Sprint Petition at 3-4; *see also* Comments of Dobson Communications Corp., ET Docket No. 04-35 at 6-7 (Mar. 2, 2005).

⁵¹⁹ *See Notice*, 30 FCC Rcd at 3222, paras. 46-47.

access lines for the critical portions of any of the special offices and facilities.⁵²⁰ Sprint argues that, as with airports, the communications infrastructure serving all special offices and facilities remains primarily landline-based, and that unless a wireless carrier provides a dedicated access line to a special office or facility, it has no way of knowing whether one of its phones is being used by personnel at such an office or facility.⁵²¹

216. As previously noted, we will extend the wireless exemption for satellite and terrestrial wireless carriers to all special offices and facilities. To the extent our decision today responds affirmatively to the requests of CTIA, Cingular, and Sprint to exempt wireless carriers from being required to report outages potentially affecting all special offices and facilities, we grant their requests, which will be reflected in our ordering clause.⁵²²

VII. PROCEDURAL MATTERS

A. Regulatory Flexibility Act

217. As required by the Regulatory Flexibility Act of 1980 (RFA),⁵²³ the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) for the Report and Order and Order on Reconsideration. The FRFA is set forth in Appendix D. Also required by the RFA, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the proposals addressed in the Further Notice. The IRFA is set forth as Appendix E. Written public comments are requested on the IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments indicated on the first page of this Further Notice. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Further Notice, including the IRFA, as well as the Report and Order and Order on Reconsideration and their FRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).⁵²⁴ In addition, the Further Notice and its IRFA, and the Report and Order and Order on Reconsideration and their FRFA (or summaries thereof) will be published in the Federal Register.

B. Paperwork Reduction Act of 1995

218. This Report and Order and Order on Reconsideration contain [new or modified] information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It [has been] submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. In this Report and Order and Order on Reconsideration, we have assessed the effects of updates to the part 4 outage reporting rules, and find that these updates does not have significant effects on business with fewer than 25 employees.

219. The Further Notice in this document contains proposed new information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the

⁵²⁰ CTIA Comments at 10-11, *citing* CTIA Petition at 2.

⁵²¹ Sprint Comments at 10; *see also* Verizon Comments at 11 (“wireline providers remain the principal (if not exclusive) providers of high capacity services and facilities to the Federal Aviation Administration and commercial airport authorities.”)

⁵²² *See infra*, para. 228.

⁵²³ *See* 5 U.S.C. § 603.

⁵²⁴ *See* 5 U.S.C. § 603(a).

general public and the Office of Management and Budget (OMB) to comment on the information collection requirements contained in this document, as required by the Paperwork Reduction Act of 1995, Public Law 104-13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we seek specific comment on how we might further reduce the information collection burden for small business concerns with fewer than 25 employees.

C. Congressional Review Act

220. The Commission will send a copy of this Report & Order and Order on Reconsideration to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

D. Ex Parte Rules

221. The proceeding this Notice initiates shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.⁵²⁵ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

E. Comment Filing Procedures

222. Pursuant to sections 1.415 and 1.419 of the Commission’s rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments should be filed in PS Dockets 15-80 and 11-82. Comments may be filed using the Commission’s Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://fjallfoss.fcc.gov/ecfs2/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission’s Secretary, Office of the Secretary, Federal Communications Commission.

⁵²⁵ 47 CFR § 1.1200 *et seq.*

- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.
- People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (TTY).

VIII. ORDERING CLAUSES

223. ACCORDINGLY IT IS ORDERED that, pursuant to the authority contained in sections 1, 4(i), 4(j), 4(o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c of the Communications Act of 1934, as amended, and section 706 of the Communications Act of 1996, 47 U.S.C. §§ 151, 154(i)-(j) & (o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, 615c, and 1302, this Report and Order in PS Docket 15-80 and 11-82 is ADOPTED.

224. IT IS FURTHER ORDERED that, pursuant to the authority contained in sections 1, 4(i), 4(j), 4(o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c of the Communications Act of 1934, as amended, and section 706 of the Communications Act of 1996, 47 U.S.C. §§ 151, 154(i)-(j) & (o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, 615c, and 1302, this Further Notice of Proposed Rulemaking in PS Docket 15-80 and 11-82 is ADOPTED.

225. IT IS FURTHER ORDERED that, pursuant to sections 4(i), 302, 303(e) 303(f), 303(g), 303(r), and 405 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302a, 303(e), 303(f), 303(g), 303(r), and 405, the Petition for Partial Reconsideration and Motion For Partial Stay filed by CTIA-The Wireless Association on December 23, 2004, the Petition of Sprint Corporation filed on January 3, 2005, and the Petition For Reconsideration filed by Cingular Wireless LLC, on January 3, 2005, in ET Docket No. 04-35, ARE GRANTED to the extent indicated herein.

226. IT IS FURTHER ORDERED that Part 4 of the Commission's Rules, 47 C.F.R. Part 4, IS AMENDED as specified in Appendix B, effective on a date ("Effective Date") that is 30 days after publication in the Federal Register, except that those amendments which contain new or modified information collection requirements that require approval by the Office of Management and Budget under the Paperwork Reduction Act WILL BECOME EFFECTIVE after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

227. IT IS FURTHER ORDERED that the Commission's Public Safety and Homeland Security Bureau SHALL DEVELOP AND RECOMMEND to the Commission proposed rules for NORS information sharing in accordance with its delegated authority and this Report and Order.

228. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of the Report and Order, Order on Reconsideration and Further Notice of Proposed Rule Making, including the Final Regulatory Flexibility

Analysis and the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the U.S. Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A
List of Parties Filing Comments or *Ex Parte* Notices

PS Docket No. 15-80

Commenters and Reply Commenters

Alliance for Telecommunications Industry Solutions (ATIS)
Association of Public-Safety Communications Officials-International, Inc. (APCO)
AT&T
California Public Utilities Commission (CPUC)
CenturyLink
Comcast Corporation
Competitive Carriers Association (CCA)
CTIA – The Wireless Association (CTIA)
INCOMPAS (or COMPTTEL)
Intrado
ITTA - The Voice of Mid-Size Communications Companies (ITTA)
Massachusetts Department of Telecommunications and Cable (MDTC)
Michigan Public Service Commission (MPSC)
National Association of Regulatory Utility Commissioners (NARUC)
National Association of State 911 Administrators (NASNA)
National Cable and Telecommunications Association (NCTA)
New York Public Service Commission (NYPSC)
NTCA-The Rural Broadband Association (NTCA)
Sprint Corporation
T-Mobile USA, Inc. (T-Mobile)
Verizon
XO Communications

Ex Parte Filers

Alliance for Telecommunications Industry Solutions (ATIS)
AT&T
California Public Utilities Commission (CPUC)
CenturyLink
Comcast
INCOMPAS (or COMPTTEL)
National Association of Counties
Public Knowledge
Verizon

PS Docket No. 11-82***Commenters and Reply Commenters***

Adrienne Abbott-Gutierrez
Alliance for Telecommunications Industry Solutions
American Cable Association
AT&T Inc.
CenturyLink
Colin G. Gallagher
Comcast Corporation
CTIA - The Wireless Association (CTIA)
Financial Services Sector Coordinating Council
Fixed Wireless Internet Service Providers
Laurence Brett Glass, d/b/a LARIAT
Level 3 Communications, LLC
Maria Palacio
Massachusetts Department of Telecommunications and Cable
MegaPath Inc.
MetroPCS Communications, Inc.
Michigan Public Service Commission
National Association of State Utility Consumer Advocates (NASUCA) and New Jersey Division of Rate Counsel
National Association of Manufacturers (NAM)
National Cable & Telecommunications Association (NCTA)
National Rural Electric Cooperative Association
National Association of Telecommunications Officers and Advisors (NATOA), the National League of Cities (NLC), and the National Association of Counties (NACo)
National Emergency Number Association (NENA): The 9-1-1 Association
New York State Public Service Commission
Paypal
Public Knowledge and Open Technology Initiative
Public Service Commission of the District of Columbia
Rita Marie Kepner, PhD
SANS Institute
Sprint Nextel Corporation
T Mobile USA, Inc.
TechAmerica
Telecommunications Industry Association
Telecommunications Law Professionals PLLC
Time Warner Cable Inc.
T-Mobile USA, Inc.
U.S. Internet Service Provider Association
United States Telecom Association
Utilities Telecom Council
Verizon and Verizon Wireless
Voice on the Net Coalition
Vonage Holdings Corp.
WCS Coalition
Wireless Communications Association International, Inc.
Wireless Internet Service Providers Association
XO Communications, LLC

Ex Parte Filers

ACA, AT&T, Centurylink, Comcast, COMPTTEL, CTIA-The Wireless Association, Comptel
American Cable Association
APCO
AT&T Services Inc.
AT&T, CenturyLink, Comcast, Verizon, Vonage, NENA
AT&T, Comcast and Verizon
Blooston Rural Carriers
Comcast Corporation
Critical Infrastructure Communications Coalition
CTIA-The Wireless Association
eBay Inc.
Edison Electric Institute
Intrado Inc.
MetroPCS Communications Inc. and Ericsson Inc.
MetroPCS Communications, Inc.
National Association of Manufacturers (NAM)
National Association of Regulatory Utility Commissioners (NARUC)
National Cable & Telecommunications Association (NCTA)
National Rural Electric Cooperative Association
National Telecommunications Cooperative Association (NTCA)
National Association of Telecommunications Officers and Advisors (NATOA)
National Emergency Number Association (NENA): The 9-1-1 Association
National Telecommunications Cooperative Association (NTCA) and the Organization for the Promotion
and Advancement of Small Telecommunications Companies (OPASTCO)
Organization for the Promotion and Advancement of Small Telecommunications Companies
(OPASTCO)
SANS Institute
Telecommunications Industry Association
Telecommunications Law Professionals PLLC
The National Association of State Utility Consumer Advocates (NASUCA)/New Jersey
T-Mobile USA, Inc.
United States Telecom Association
Utilities Telecom Council
Verizon
Voice on the Net Coalition
Vonage Holdings Corp.
Wireless Communications Association International, Inc.
XO Communications

APPENDIX B

Final Rules

For the reasons discussed in the preamble, the Federal Communications Commission amends Part 4 of Title 47 of the Code of Federal Regulations as follows:

PART 4 – DISRUPTIONS TO COMMUNICATIONS

1. The authority citation for Part 4 is revised to read as follows:

Authority: Sections 1, 4(i), 4(j), 4(o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c of the Communications Act of 1934, as amended, and section 706 of the Communications Act of 1996, 47 U.S.C. §§ 151, 154(i)-(j) & (o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, 615c, and 1302, unless otherwise noted.

2. Section 4.5 is amended by revising paragraphs (b) and (c) as follows and deleting and reserving paragraph (d):

§ 4.5 Definitions of outage, special offices and facilities, and 911 special facilities.

* * *

(b) *Special offices and facilities* are defined as entities enrolled in the Telecommunications Service Priority (TSP) Program at priority Levels 1 and 2, which may include, but are not limited to, major military installations, key government facilities, nuclear power plants, and those airports that are listed as current primary (PR) airports in the FAA's National Plan of Integrated Airports Systems (NPIAS) (as issued at least one calendar year prior to the outage).

(c) A critical communications outage that potentially affects an airport is defined as an outage that: (i) disrupts 50 percent or more of the air traffic control links or other FAA communications links to any airport; (ii) has caused an Air Route Traffic Control Center (ARTCC) or airport to lose its radar; (iii) causes a loss of both primary and backup facilities at any ARTCC or airport; (iv) affects an ARTCC or airport that is deemed important by the FAA as indicated by FAA inquiry to the provider's management personnel; or (v) has affected any ARTCC or airport and that has received any media attention of which the communications provider's reporting personnel are aware.

(d) (Reserved) * * *

* * * * *

3. Section 4.7 is amended by revising paragraphs (d) and (e) to read as follows:

§ 4.7 Definition of metrics used to determine the general outage-reporting threshold criteria.

* * *

(d) *Optical Carrier 3 (OC3) minutes* are defined as the mathematical result of multiplying the duration of an outage, expressed in minutes, by the number of previously operating OC3 circuits or their equivalents that were affected by the outage.

(e) * * *

(2) The mathematical result of multiplying the duration of an outage, expressed in minutes, by the number of end users potentially affected by the outage, for all other forms of communications. For interconnected VoIP service providers to mobile users, the number of potentially affected users should be determined by multiplying the simultaneous call capacity of the affected equipment by a concentration ratio of 8.

* * * * *

4. Section 4.9 is amended by replacing “DS3” with “OC3” in paragraphs (a)(2), (a)(4), (b), (f)(2) and (f)(4), and replacing “1,350” with “667” in paragraphs (a)(2), (b), and (f)(2).

5. Section 4.9(e) is also revised to read as follows:

(e)(1) All wireless service providers shall submit electronically a Notification to the Commission within 120 minutes of discovering that they have experienced on any facilities that they own, operate, lease, or otherwise utilize, an outage of at least 30 minutes duration:

(i) Of a Mobile Switching Center (MSC);

(ii) That potentially affects at least 900,000 user minutes of either telephony and associated data (2nd generation or lower) service or paging service;

(iii) That affects at least 667 OC3 minutes (as defined in § 4.7);

(iv) That potentially affects any special offices and facilities (in accordance with paragraphs (a) through (d) of § 4.5) other than airports through direct service facility agreements; or

(v) That potentially affects a 911 special facility (as defined in paragraph (e) of § 4.5), in which case they also shall notify, as soon as possible by telephone or other electronic means, any official who has been designated by the management of the affected 911 facility as the provider's contact person for communications outages at that facility, and they shall convey to that person all available information that may be useful to the management of the affected facility in mitigating the effects of the outage on callers to that facility.

(2) In determining the number of users potentially affected by a failure of a switch, a wireless provider must multiply the number of macro cell sites disabled in the outage by the average number of users served per site, which is calculated as the total number of users for the provider divided by the total number of the provider's macro cell sites.

(3) For providers of paging service only, a notification must be submitted if the failure of a switch for at least 30 minutes duration potentially affects at least 900,000 user-minutes.

(4) Not later than 72 hours after discovering the outage, the provider shall submit electronically an Initial Communications Outage Report to the Commission. Not later than 30 days after discovering the outage, the provider shall submit electronically a Final Communications Outage Report to the Commission.

(5) The Notification and Initial and Final reports shall comply with the requirements of § 4.11.

5. Section 4.13 is deleted and reserved.

APPENDIX C**Proposed Rules**

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend Part 4 of Title 47 of the Code of Federal Regulations (CFR) as follows:

PART 4 – DISRUPTIONS TO COMMUNICATIONS**GENERAL**

1. The authority citation for Part 4 is revised to read as follows:

Authority: Sections 1, 4(i), 4(j), 4(o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c of the Communications Act of 1934, as amended, and section 706 of the Communications Act of 1996, 47 U.S.C. §§ 151, 154(i)-(j) & (o), 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, 615c, and 1302, unless otherwise noted.

2. Section 4.3 is amended by renumbering paragraph (i) as paragraph (l) and adding new paragraphs (i) and (j) to read as follows:

§ 4.3 Communications providers covered by the requirements of this part.

* * *

(i) *Broadband Internet access service providers (BIAS)* are providers of broadband Internet access service, as defined in § 8.2 of this chapter.

(j) *Dedicated Service providers* are providers of service that transports data between two or more designated points, e.g., between an end user's premises and a point-of-presence, between the central office of a local exchange carrier (LEC) and a point-of-presence, or between two end user premises, at a rate of at least 1.5 Mbps in both directions (upstream/downstream) with prescribed performance requirements that include bandwidth, latency, or error-rate guarantees or other parameters that define delivery under a tariff or in a service-level agreement.

3. Section 4.7(e)(2) is amended to read as follows:

§ 4.7 Definitions of metrics used to determine reporting of outages and disruptions to communications.

* * *

(e)(2) The mathematical result of multiplying the duration of an outage, expressed in minutes, by the number of end-users potentially affected by the outage, for all other forms of communications.

4. Section 4.7 is amended by revising the title and adding paragraphs (g)-(i) to read as follows:

§ 4.7 Definitions of metrics used to determine reporting of outages and disruptions to communications.

* * *

(g) *Packet loss* is defined as the loss of one or more packets of data traveling across a network, which after being transmitted from a source, fail(s) to reach the destination point designated in the transmitting message.

(h) *Latency* is defined as the average time delay for a packet to travel from a source to a destination.

(i) *Throughput* is the amount of information transferred within a system in a given amount of time.

* * * * *

5. Section 4.9 is amended by amending paragraph (g) and adding paragraphs (i) through (j) to read as follows:

§ 4.9 Outage reporting requirements – threshold criteria.

* * *

(g) *Interconnected VoIP Service.*

(1)(ii) Within 120 minutes of discovering that they have experienced on any facilities that they own, operate, lease, or otherwise utilize, an outage of at least 30 minutes duration that:

(A) Potentially affects at least 900,000 user minutes of Interconnected VoIP service and results in complete loss of service;

(B) Potentially affects 22,500 Gbps user minutes; or

(C) Potentially affects any special offices and facilities (in accordance with paragraphs (a)-(d) of § 4.5).

(2) Not later than 72 hours after discovering the outage, the provider shall submit electronically an Initial Communications Outage Report to the Commission. Not later than 30 days after discovering the outage, the provider shall submit electronically a Final Communications Outage Report to the Commission. The Notification and the Initial and Final reports shall comply with the requirements of § 4.11.

* * *

(i) *BIAS or Dedicated Service Providers.*

(1) All BIAS providers and Dedicated Service providers, as defined in section 4.3 shall submit electronically a Notification to the Commission within 120 minutes of discovering that they have experienced on any facilities that they own, operate, lease, or otherwise utilize, an outage of at least 30 minutes duration that:

(i) Potentially affects at least 22,500 Gbps user minutes;

(ii) Potentially affects any special offices and facilities (in accordance with paragraphs (a)-(d) of § 4.5); or

(iii) Potentially affects a 911 special facility (as defined in (e) of § 4.5).

(2) Not later than 72 hours after discovering the outage, BIAS providers and Dedicated Service providers, as defined in section 4.3, shall submit electronically an Initial Communications Outage Report to the Commission. Not later than 30 days after discovering the outage, the broadband Internet access service provider shall submit electronically a Final Communications Outage Report to the Commission. The Notification and the Initial and Final reports shall comply with the requirements of § 4.11.

* * * * *

APPENDIX D

Final Regulatory Flexibility Analysis for the Report and Order and Order on Reconsideration

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications; New Part 4 of the Commission's Rules Concerning Disruptions to Communications, *Notice of Proposed Rulemaking, Second Report and Order, and Order on Reconsideration*.² The Commission sought written public comment on the proposals in the *Notice*, including comment on the IRFA. The comments received are discussed below. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.³

A. Need for, and Objectives of, the Report and Order and Order on Reconsideration

2. In the Report and Order, we take specific steps to improve our current part 4 rules by adopting various proposals made in a Notice of Proposed Rulemaking (*Notice*) adopted earlier this year.⁴ These specific amendments stem from our experience with outage reporting over the past ten years, and will enhance the information we receive on outages for services already covered in part 4. In this Report and Order, we adopt the following changes to our part 4 outage reporting rules:

- update the reporting metric and threshold for communication disruptions impacting major transport facilities from a DS3-based to OC3-based standard, and reduce the reporting window for simplex events (transmission line disruptions) from five days to four days;
- update the reporting of wireless outages by adopting a standardized method to calculate the number of users “potentially affected” in an outage, and clarify that, when an outage affects only some 911 calling centers, or public safety answering points (PSAPs), served by a mobile switching center, wireless providers may utilize their own identifiable scheme to allocate the number of potentially affected users so long as the allocation reflects the relative size of the affected PSAP(s);
- find that a “loss of communications” to a PSAP occurs when there is a network malfunction or higher-level issue that significantly degrades or prevents 911 calls from being completed to PSAPs, including when 80 percent or more of a provider's trunks serving a PSAP become disabled;
- update the rules regarding reporting of outages affecting “special offices and facilities” by (i) extending the reporting obligation to high-level enrollees in the Telecommunications Service Priority program, (ii) eliminating outdated and non-applicable rules, (iii) narrowing the types of airports that are considered “special offices and facilities,” and (iv) limiting outage reporting from airports to critical communications only; and

¹ 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 – 612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications; New Part 4 of the Commission's Rules Concerning Disruptions to Communications*, Notice of Proposed Rulemaking, Second Report and Order, and Order on Reconsideration, 30 FCC Rcd 3206, 3237-43 (2015) (Appendix D, Initial Regulatory Flexibility Analysis).

³ 5 U.S.C. § 604.

⁴ *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications; New Part 4 of the Commission's Rules Concerning Disruptions to Communications*, Notice of Proposed Rulemaking, Second Report and Order, and Order on Reconsideration, 30 FCC Rcd 3206 (2015) (*2015 Part 4 Notice* or *Notice*).

- conclude that direct access to NORS by our state and federal partners is in the public interest, but determine that further consideration is warranted to ensure that the process includes adequate safeguards to maintain the security and confidentiality of sensitive information, and accordingly direct the Public Safety and Homeland Security Bureau (Bureau) to study these issues and develop recommendations for the successful implementation of our information-sharing proposals.

3. The Order on Reconsideration limits outage reporting for events affecting airports to those outages that impact airport critical communications, and exempts satellite and terrestrial wireless carriers from reporting outages affecting all “special offices and facilities,” extending the exemption previously limited to airports.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

4. The IRFA solicited comment on the impact of the proposed rules to small businesses, as required by the RFA. While no comments were submitted specifically in response to the IRFA, a few commenters express concerns about the estimated costs for reporting. NTCA urges the Commission to consider small rural service providers and their unique circumstances.⁵ Other commenters argue that we underestimate the time burdens associated with filing NORS reports. We maintain that the reports cost an estimated \$160 to file, and that other costs associated with “setting up and implementing a monitoring regime” are routine business costs independent of our reporting requirements.⁶

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

5. The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by rules such as those adopted herein.⁷ The RFA generally defines the term “small entity” the same as the terms “small business,” “small organization,” and “small governmental jurisdiction.”⁸ In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act.⁹ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).¹⁰

1. Total Small Entities

6. Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards.¹¹ First, nationwide, there are a total of approximately 28.2 million small businesses, according to the

⁵ NTCA Reply at 2

⁶ See NCTA Reply at 4; *see also* ATIS Comments at 3-4; AT&T Comments at 3, 5-9; Sprint Comments at 13-14; T-Mobile Reply at 7.

⁷ 5 U.S.C. § 604(a)(3).

⁸ 5 U.S.C. § 601(6).

⁹ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

¹⁰ 15 U.S.C. § 632.

¹¹ *See* 5 U.S.C. §§ 601(3)–(6).

SBA.¹² In addition, a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹³ Nationwide, as of 2007, there were approximately 1,621,315 small organizations.¹⁴ Finally, the term “small governmental jurisdiction” is defined generally as “governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹⁵ Census Bureau data for 2011 indicate that there were 89,476 local governmental jurisdictions in the United States.¹⁶ We estimate that, of this total, as many as 88,506 entities may qualify as “small governmental jurisdictions.”¹⁷ Thus, we estimate that most governmental jurisdictions are small.

2. Wireline Providers

7. *Incumbent Local Exchange Carriers (Incumbent LECs)*. Neither the Commission nor the SBA has developed a small business size standard specifically for incumbent local exchange services. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers, which are establishments primarily engaged in operating or providing access to transmission facilities and infrastructure that they own or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks.¹⁸ Under that size standard, such a business is small if it has 1,500 or fewer employees.¹⁹ Census Bureau data for 2007 show that there were 3,188 firms in this category that operated for the entire year. Of this total, 3,144 had employment of 999 or fewer, and 44 firms had employment of 1,000 employees or more.²⁰ Thus, under this category and the associated small business size standard, the majority of these incumbent local exchange service providers can be considered small.

¹² See SBA, Office of Advocacy, “Frequently Asked Questions,” https://www.sba.gov/sites/default/files/advocacy/FAQ_March_2014_0.pdf (last visited May 25, 2016), figures are from 2011.

¹³ 5 U.S.C. § 601(4).

¹⁴ INDEPENDENT SECTOR, *THE NEW NONPROFIT ALMANAC & DESK REFERENCE* (2010).

¹⁵ 5 U.S.C. § 601(5).

¹⁶ U.S. CENSUS BUREAU, *STATISTICAL ABSTRACT OF THE UNITED STATES: 2012*, Table 428, <http://www.census.gov/compendia/statab/2012/tables/12s0429.pdf> (Data cited therein from 2007) (last visited May 25, 2016).

¹⁷ The 2007 U.S. Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 small governmental organizations in 2007. If we assume that county, municipal, township and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,125. If we make the same assumption about special districts, and also assume that special districts are different from county, municipal, township, and school districts, in 2007 there were 37,381 special districts. Therefore, of the 89,476 small governmental organizations documented in 2007, as many as 89,506 may be considered small under the applicable standard. This data may overestimate the number of such organizations that has a population of 50,000 or less. U.S. CENSUS BUREAU, *STATISTICAL ABSTRACT OF THE UNITED STATES: 2012*, Tables 428, 429, <http://www.census.gov/compendia/statab/2012/tables/12s0429.pdf> (Data cited therein are from 2007).

¹⁸ *2012 NAICS Definition 517110 Wired Telecommunications Carriers*, U.S. CENSUS BUREAU, <http://www.census.gov/eos/www/naics/index.html> (search “2012 NAICS Search” for “517110”) (last visited May 25, 2016).

¹⁹ 13 CFR § 121.201, NAICS code 517110.

²⁰ *EC0751SSSZ5, Information: Subject Series – Establishment and Firm Size: Employment Size of Firms for the United States: 2007 Economic Census*, U.S. CENSUS BUREAU, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

8. The Commission has included small incumbent LECs in this present RFA analysis. As noted above, a “small business” under the RFA is one that, *inter alia*, meets the pertinent small business size standard (e.g., a telephone communications business having 1,500 or fewer employees), and “is not dominant in its field of operation.”²¹ The SBA’s Office of Advocacy contends that, for RFA purposes, small incumbent LECs are not dominant in their field of operation because any such dominance is not “national” in scope.²² The Commission has therefore included small incumbent LECs in this RFA analysis, although the Commission emphasizes that this RFA action has no effect on Commission analyses and determinations in other, non-RFA contexts.

9. *Interexchange Carriers*. Neither the Commission nor the SBA has developed a small business size standard specifically for providers of interexchange services. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers, which are establishments primarily engaged in operating or providing access to transmission facilities and infrastructure that they own or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks.²³ Under that size standard, such a business is small if it has 1,500 or fewer employees.²⁴ Census Bureau data for 2007 show that there were 3,188 firms in this category that operated for the entire year. Of this total, 3,144 had employment of 999 or fewer, and 44 firms had employment of 1,000 employees or more.²⁵ Thus, under this category and the associated small business size standard, the Commission estimates that the majority of interexchange carriers are small entities that may be affected by our proposed action.

3. Wireless Providers – Fixed and Mobile

10. *Wireless Telecommunications Carriers (except Satellite)*. Since 2007, the Census Bureau has placed wireless firms within this new, broad, economic census category.²⁶ This category is composed of establishments that operate and maintain switching and transmission facilities to provide communications *via* the airwaves. As holders of spectrum licenses, these establishments use the licensed spectrum to provide services, such as cellular phone services, paging services, wireless Internet access, and wireless video services.²⁷ The SBA has deemed a wireless business to be small if it has 1,500 or

²¹ Small Business Act, 15 U.S.C. § 632.

²² The Small Business Act contains a definition of “small business concern,” which the RFA incorporates into its own definition of “small business.” See 15 U.S.C. § 632(a)(1); see also 5 U.S.C. § 601(3) (stating that the term “small business” has the same meaning as the term “small business concern” as defined in the Small Business Act). SBA regulations interpret “small business concern” to include the concept of dominance on a national basis. See 13 CFR § 121.102(b).

²³ *2012 NAICS Definition 517110 Wired Telecommunications Carriers*, U.S. CENSUS BUREAU, <http://www.census.gov/eos/www/naics/index.html> (search “2012 NAICS Search” for “517110”) (last visited May 25, 2016).

²⁴ 13 CFR § 121.201, NAICS code 517110.

²⁵ *EC0751SSSZ5, Information: Subject Series – Establishment and Firm Size: Employment Size of Firms for the United States: 2007 Economic Census*, U.S. CENSUS BUREAU, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodT_ye=table (last visited May 25, 2016).

²⁶ *2012 NAICS Definition 517210 Wireless Telecommunications Carriers (Except Satellite)*, U.S. CENSUS BUREAU, <http://www.census.gov/eos/www/naics/index.html> (search “2012 NAICS Search” for “517210”) (last visited May 25, 2016).

²⁷ *2012 NAICS Definition 517210 Wireless Telecommunications Carriers (Except Satellite)*, U.S. CENSUS BUREAU, <http://www.census.gov/eos/www/naics/index.html> (search “2012 NAICS Search” for “517210”) (last visited May 25, 2016).

fewer employees.²⁸ For the category of Wireless Telecommunications Carriers (except Satellite), Census data for 2007, which supersede data contained in the 2002 Census, show that there were 1,383 firms that operated that year.²⁹ Of those, 1,368 had fewer than 100 employees, and 15 firms had more than 100 employees. Thus, under this category and the associated small business size standard, the majority of firms can be considered small. Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, Personal Communications Service (PCS), and Specialized Mobile Radio (SMR) Telephony services.³⁰ Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.³¹ Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

4. Satellite Service Providers

11. *Satellite Telecommunications Providers.* Two economic census categories address the satellite industry. The first category, Satellite Telecommunications, has a small business size standard of \$15 million or less in average annual receipts, under SBA rules.³² The second category is “All Telecommunications Providers,” which is discussed in a separate section.

12. The category of *Satellite Telecommunications* “comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals *via* a system of satellites or reselling satellite telecommunications.”³³ Census Bureau data for 2007 show that 512 Satellite Telecommunications firms operated for that entire year.³⁴ Of this total, 464 firms had annual receipts of under \$10 million, and 18 firms had receipts of \$10 million to \$24,999,999.³⁵ Consequently, the Commission estimates that the majority of Satellite Telecommunications firms are small entities that might be affected by our action.

5. Cable Service Providers

13. *Cable Companies and Systems.* The Commission has developed its own small business size standards for the purpose of cable rate regulation. Under the Commission’s rules, a “small cable

²⁸ 13 CFR § 121.201 (listing wireless telecommunications carriers under NAICS code 517210 and identifying 1,500 employees as the maximum size standard for the business to be considered small). The now-superseded, pre-2007 CFR citations were 13 CFR § 121.201, NAICS codes 517211 and 517212 (referring to the 2002 NAICS).

²⁹ *EC0751SSSZ5, Information: Subject Series – Establishment and Firm Size: Employment Size of Firms for the United States: 2007 Economic Census*, U.S. CENSUS BUREAU, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodTtype=table (last visited May 25, 2016).

³⁰ FCC, TRENDS IN TELEPHONE SERVICE 5-5 (2010).

³¹ *Id.*

³² 13 CFR § 121.201, NAICS code 517410.

³³ *2012 NAICS Definition 517410 Satellite Telecommunications*, U.S. CENSUS BUREAU, <http://www.census.gov/eos/www/naics/index.html> (search “2012 NAICS Search” for “517410”) (last visited May 25, 2016).

³⁴ *EC0751SSSZ4, Information: Subject Series – Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 Economic Census*, U.S. CENSUS BUREAU, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodTtype=table (last visited May 25, 2016).

³⁵ *See id.*

company” is one serving a total of 400,000 or fewer subscribers over one or more cable systems.³⁶ Industry data indicate that all but ten cable operators nationwide are small under this size standard.³⁷ In addition, under the Commission’s rules, a “small system” is a cable system serving 15,000 or fewer subscribers.³⁸ Industry data indicate that, of the 6,101 systems nationwide, 4,410 systems have less than 10,000 subscribers, and an additional 258 systems have between 10,000-19,999 subscribers.³⁹ Thus, under this standard, most cable systems are small.

14. *Cable System Operators.* The Communications Act of 1934, as amended, also contains a size standard for small cable system operators, which is “a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000.”⁴⁰ The Commission has determined that an operator serving fewer than 677,000 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed \$250 million in the aggregate.⁴¹ Industry data indicate that, of 1,076 cable operators nationwide, all but ten are small under this size standard.⁴² We note that the Commission neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250 million,⁴³ and therefore, we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

6. All Other Telecommunications

15. The 2007 NAICS defines “All Other Telecommunications” as follows: “This U.S. industry comprises establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from satellite systems. Establishments providing Internet services

³⁶ 47 CFR § 76.901(e). The Commission determined that this size standard equates approximately to a size standard of \$100 million or less in annual revenues. *Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation*, Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408 ¶ 28 (1995).

³⁷ See ProQuest, *Broadcasting & Cable Yearbook 2010 C-2* (2009) (data current as of Dec. 2009).

³⁸ 47 CFR § 76.901(c) (providing that “[t]he service area of a small system shall be determined by the number of subscribers that are served by the system's principal headend, including any other headends or microwave receive sites that are technically integrated to the principal headend”).

³⁹ *Television & Cable Factbook 2009 F-2* (Albert Warren, ed., 2008) (data current as of Oct. 2008). The data do not include 957 systems for which classifying data were not available.

⁴⁰ 47 U.S.C. § 543(m)(2); see also 47 CFR § 76.901(f) (“A small cable operator is an operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000.”); 47 CFR § 76.901(f) at nn.1–3 (discussing how the Commission calculates subscriber counts and affiliation percentages for the purposes of determining whether an entity qualifies as a small cable operator).

⁴¹ FCC Announces New Subscriber Count for the Definition of Small Cable Operator, *Public Notice*, DA 01-158, 16 FCC Rcd 2225 (2001).

⁴² *BROADCASTING & CABLE YEARBOOK 2006 A-8, C-2* (Harry A. Jessell ed., 2005) (data current as of June 30, 2005); *TELEVISION & CABLE FACTBOOK 2006 D-805 to D-1857* (Albert Warren ed., 2005).

⁴³ The Commission does receive such information on a case-by-case basis if a cable operator appeals a local franchise authority’s finding that the operator does not qualify as a small cable operator pursuant to § 76.901(f) of the Commission’s rules.

or voice over Internet protocol (VoIP) services *via* client-supplied telecommunications connections are also included in this industry.”⁴⁴ This category has a size standard of \$25 million or less in annual receipts.⁴⁵ Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year.⁴⁶ Of this total, 2,305 firms had annual receipts of under \$10 million and 41 firms had annual receipts of \$10 million to \$24,999,999.⁴⁷ Consequently, we estimate that the majority of All Other Telecommunications firms are small entities that might be affected by our action.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

16. The rules adopted in the Report and Order and Order on Reconsideration require telecommunications providers to report those outages that meet specified NORS outage reporting threshold criteria,⁴⁸ largely determined by the number of end users potentially affected by the outage and the duration of the outage. In the Commission’s experience administering NORS, small companies only rarely experience outages that meet the NORS outage reporting threshold criteria.⁴⁹ Accordingly, the rules adopted today, in some cases increase, in others, decrease the number of outage reports annually filed with the Commission. We expect that small companies will only be slightly impacted by our rule changes adopted today. However, we expect that telecommunications providers will continue to track, investigate, and correct all of their service disruptions as an ordinary course of business operations and maintenance—including addressing service disruptions that do not trigger outage reporting requirements. Telecommunications providers, through internal network operation center personnel, already file required Notifications and Reports,⁵⁰ which typically involves an online form less than three pages in length and is based on data routinely collected and monitored by this same personnel. The form is designed to allow small entities to input information without the need for specialized professionals; however, telecommunications providers may choose to hire consultants or engineers to address technical aspects of reporting, or legal counsel review compliance with applicable rules. On balance, we believe the only burden associated with the reporting requirements contained here will be the time required to complete any additional Notifications and Reports following the proposed changes.

E. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

17. The RFA requires an agency to describe any significant alternatives that it has considered in developing its approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”⁵¹

⁴⁴ 13 CFR § 121.201, NAICS code 517919.

⁴⁵ *Id.*

⁴⁶ *EC0751SSSZ4, Information: Subject Series – Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 Economic Census*, U.S. CENSUS BUREAU, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodType=table (last visited May 25, 2016).

⁴⁷ *Id.* The remaining 14 firms had annual receipts of \$25 million or more. *Id.*

⁴⁸ 47 CFR pt. 4.

⁴⁹ 47 CFR § 4.9.

⁵⁰ 47 CFR § 4.11.

⁵¹ 5 U.S.C. § 603(c)(1) – (c)(4).

18. The new and updated reporting requirements are minimally necessary to assure that we receive adequate information to perform our statutory responsibilities with respect to the reliability of telecommunications and their infrastructures. Also, we believe that outage reporting triggers are set sufficiently high as to make it unlikely that small businesses would be impacted significantly by the final rules. In fact, we anticipate that in many instances, small businesses will find their burden decreased by the new reporting thresholds. The Commission considered other possible proposals and sought comment on the reporting thresholds and the analysis presented.

F. Federal Rules that Might Duplicate, Overlap, or Conflict with the Rules

19. None.

APPENDIX E

Initial Regulatory Flexibility Analysis for the Further Notice of Proposed Rulemaking

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this Further Notice of Proposed Rule Making (Further Notice). Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments provided in “Comment Period and Procedures” of this Further Notice. The Commission will send a copy of this Further Notice, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).² In addition, the Further Notice and IRFA (or summaries thereof) will be published in the Federal Register.³

A. Need for, and Objectives of, the Proposed Rules

2. The Further Notice seeks additional comment on various proposals first issued in a *Notice of Proposed Rulemaking* in PS Docket 11-80, adopted in 2011⁴ and in a *Notice of Proposed Rulemaking* in PS Docket No. 15-80, adopted in 2015.⁵ The proposals in the Further Notice will enhance the information received concerning networks currently covered under part 4 (including wireline, wireless, interconnected VoIP, and limited reporting from certain dedicated service providers) and extend the Commission’s communications disruption visibility into other IP-based networks. The proposals build upon our extensive outage reporting experience administering the part 4 rules for legacy networks and services.

3. As explained in the IRFA prepared for the *2011 Notice*, broadband communications are increasingly utilized for the provision of 911 service.⁶ The outage reporting rules in place in 2011 covered legacy circuit-switched voice and/or paging communications over wireline, wireless, cable and satellite communications facilities and platforms, but did not cover interconnected VoIP service providers or broadband Internet Service Providers (ISPs) on whose networks interconnected VoIP services are carried. As a result, the Commission did not receive reports on VoIP, broadband, or all dedicated service outages, and thus lacked a reliable means of monitoring the reliability and availability of 911 and E911 communications that depend on these systems. The *2011 Notice* thus proposed to extend the Commission’s mandatory outage reporting rules to cover interconnected VoIP service⁷ providers,

¹ 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-12., has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121. Title II, 110 Stat. 857 (1996).

² 5 U.S.C. § 603(a).

³ *See id.*

⁴ *Proposed Extension of Part 4 of the Commission’s Rules Regarding Outage Reporting to Interconnected Voice Over Internet Protocol Service Providers and Broadband Internet Service Providers*, Notice of Proposed Rulemaking, 26 FCC Rcd 7166 (2011) (*2011 Part 4 Notice*)

⁵ *Amendments to Part 4 of the Commission’s Rules Concerning Disruptions to Communications; New Part 4 of the Commission’s Rules Concerning Disruptions to Communications*, Notice of Proposed Rulemaking, Second Report and Order, and Order on Reconsideration, 30 FCC Rcd 3206 (2015) (*Notice*).

⁶ *2011 Part 4 Notice*, 26 FCC Rcd at 7202-7222.

⁷ 47 CFR § 9.3 defines an interconnected Voice over Internet Protocol (VoIP) service as a service that: (1) enables real-time, two-way voice communications; (2) requires a broadband connection from the user’s location; (3) requires Internet protocol-compatible customer premises equipment (CPE); and (4) permits users generally to receive calls that originate on the public switched telephone network and to terminate calls to the public switched telephone network.

broadband Internet access service providers and broadband backbone Internet service providers. In 2012, the Commission adopted limited reporting obligations for interconnected VoIP providers only, and deferred action on all broadband outage reporting.

4. The role of IP-based services in the nation's communications infrastructure has now reached a point where the Commission's visibility into the operational status of broadband networks is critical to its public safety mission. Additionally, we wish to further enhance and modernize the part 4 outage rules as they relate to legacy networks, which themselves are transitioning and evolving to more modern facilities and platforms. Therefore, in the Further Notice, we seek comment on:

- a proposal to require the filing of outage reports for broadband network disruptions (BIAS and dedicated service), including disruptions based on network performance degradation;
- proposed updates to the rules governing interconnected VoIP outage reporting to (i) include disruptions based on network performance degradation, and (ii) modify the VoIP outage reporting process to make it consistent with other services;
- reporting of call failures in wireless radio access networks and wireline local access networks, and on geography-based reporting of wireless outages in rural areas;
- refining the definition of "critical communications" at airports.

5. The Commission traditionally has addressed network resiliency and reliability issues by working with communications service providers to develop and promote best practices that address network vulnerabilities, and by measuring the effectiveness of best practices through outage reporting. Under the Commission's current rules, the outage reporting process has been effective in improving the reliability, resiliency and security of legacy networks and the services delivered over them. Commission staff collaborate with individual providers and industry organizations to review outage results and address areas of concern. These efforts have resulted in significant reductions in outages affecting legacy services, including interconnected VoIP. The aim of extending outage reporting to cover broadband providers is to achieve a similar result: enhance the reliability, resiliency and security of their services utilizing an approach -- tailored as appropriate to account for broadband's unique aspects -- that has produced significant benefits with respect to legacy networks and services.

B. Legal Basis

6. The legal bases for the rule changes proposed in this Further Notice are contained in Sections 1, 4(i), 4(j), 4(o), 201(b), 214(d), 218, 222, 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c, 706 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i)-(j) & (o), 201(b), 214(d), 218, 222, 251(e)(3), 254, 301, 303(b), 303(g), 303(r), 307, 309(a), 309(j), 316, 332, 403, 615a-1, and 615c, 1302(a) and 1302(b).

C. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

7. The RFA directs agencies to provide a description of, and, where feasible, an estimate of, the number of small entities that may be affected by the proposed rules adopted herein.⁸ The RFA generally defines the term "small entity" the same as the terms "small business," "small organization," and "small governmental jurisdiction."⁹ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.¹⁰ A small business concern is one which:

⁸ 5 U.S.C. § 603(b)(3).

⁹ 5 U.S.C. § 601(6).

(1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).¹¹

1. Total Small Entities

8. Our action may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards.¹² First, nationwide, there are a total of approximately 28.2 million small businesses, according to the SBA.¹³ In addition, a “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹⁴ Nationwide, as of 2007, there were approximately 1,621,315 small organizations.¹⁵ Finally, the term “small governmental jurisdiction” is defined generally as “governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹⁶ Census Bureau data for 2011 indicate that there were 89,476 local governmental jurisdictions in the United States.¹⁷ We estimate that, of this total, as many as 88,506 entities may qualify as “small governmental jurisdictions.”¹⁸ Thus, we estimate that most governmental jurisdictions are small.

2. Interconnected VoIP and Broadband ISPs services

9. *Internet Service Providers.* The 2007 Economic Census places these firms, the services of which might include Voice over Internet protocol (VoIP), in either of two categories, depending on whether the service is provided over the provider’s own telecommunications facilities (e.g., cable and DSL ISPs), which are considered within the Wired Telecommunications Carriers category. Or, depending on whether the VoIP service is provided over client-supplied telecommunications connections (e.g., dial-up ISPs), which are considered within the All Other Telecommunications category. To ensure that this IRFA describes the universe of small entities that our action might affect, we discuss below, in

(Continued from previous page) _____

¹⁰ 5 U.S.C. § 601(3) (incorporating by reference the definition of “small business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

¹¹ Small Business Act, 15 U.S.C. § 632.

¹² 5 U.S.C. §§ 601(3)–(6).

¹³ SBA, Office of Advocacy, “Frequently Asked Questions,” (March 2014), https://www.sba.gov/sites/default/files/FAQ_March_2014_0.pdf (figures from 2011).

¹⁴ 5 U.S.C. § 601(4).

¹⁵ Independent Sector, *The New Nonprofit Almanac & Desk Reference* (2010).

¹⁶ 5 U.S.C. § 601(5).

¹⁷ U.S. Census Bureau, *Statistical Abstract of the United States: 2011*, Table 427 (Data cited therein from 2007).

¹⁸ The 2007 U.S. Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 small governmental organizations in 2007. If we assume that county, municipal, township and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,125. If we make the same assumption about special districts, and also assume that special districts are different from county, municipal, township, and school districts, in 2007 there were 37,381 special districts. Therefore, of the 89,476 small governmental organizations documented in 2007, as many as 89,506 may be considered small under the applicable standard. This data may overestimate the number of such organizations that has a population of 50,000 or less. U.S. Census Bureau, *Statistical Abstract of the United States: 2011*, Tables 426, 427 (Data cited therein are from 2007).

turn, several different types of entities that might be currently providing interconnected VoIP service, broadband Internet access service, or business data services.

10. *VoIP service provided over the provider's own telecommunications facilities.* Neither the Commission nor the SBA has defined a small business size standard specifically for VoIP service provided over the provider's own telecommunications facilities (e.g., cable and DSL ISPs). The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers.¹⁹ This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception, establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.²⁰ In this category, the SBA deems a wired telecommunications carrier to be small if it has 1,500 or fewer employees.²¹ Census data for 2007 shows 3,188 firms in this category.²² Of these, 3,144 had fewer than 1,000 employees. On this basis, the Commission estimates that a substantial majority of the providers of wired telecommunications carriers are small.²³

11. *VoIP service provided over client-supplied telecommunications connections.* In addition, neither the Commission nor the SBA has defined a small business size standard specifically for VoIP service provided over client-supplied telecommunications connections (e.g., dial-up ISPs). The appropriate size standard under SBA rules is for the category All Other Telecommunications.²⁴ This industry “comprises establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.”²⁵ The SBA has developed a small business size standard for All Other

¹⁹ U.S. Census Bureau, 2007 NAICS Definitions, “517110 Wired Telecommunications Carriers,” <http://www.census.gov/naics/2007/def/ND517110.HTM#N517110> (last visited May 25, 2016).

²⁰ *Id.*

²¹ 13 CFR § 121.201, NAICS Code 517110.

²² U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, “Firms operated for the entire year,” http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

²³ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

²⁴ 13 CFR § 121.201, NAICS code 517919.

²⁵ U.S. Census Bureau, North American Industry Classification System, Definition of “All Other Telecommunications,” NAICS code 517919, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch> (last visited May 25, 2016).

Telecommunications, which consists of all such firms with annual receipts of \$ 32.5 million or less.²⁶ For this category, Census Bureau data for 2007 show that there were 2,383 firms that operated for the entire year.²⁷ Of those firms, a total of 2,346 had annual receipts less than \$25 million.²⁸ Consequently, we conclude that the majority of All Other Telecommunications firms can be considered small.

3. Wireline Providers

12. *Incumbent Local Exchange Carriers (Incumbent LECs)*. Neither the Commission nor the SBA has developed a small business size standard specifically for incumbent local exchange services. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers. This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception, establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.²⁹ In this category, the SBA deems a wired telecommunications carrier to be small if it has 1,500 or fewer employees.³⁰ Census data for 2007 shows 3,188 firms in this category.³¹ Of these, 3,144 had fewer than 1,000 employees. On this basis, the Commission estimates that a substantial majority of the providers of wired telecommunications carriers are small.³²

13. The Commission has included small incumbent LECs in this present RFA analysis. As noted above, a “small business” under the RFA is one that, *inter alia*, meets the pertinent small business size standard (e.g., a telephone communications business having 1,500 or fewer employees), and “is not dominant in its field of operation.”³³ The SBA’s Office of Advocacy contends that, for RFA purposes,

²⁶ 13 CFR § 121.201, NAICS code 517919.

²⁷ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ4, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517919, “Firms operated for the entire year,” http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodType=table# (last visited May 25, 2016).

²⁸ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ4, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517919, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodType=table# (last visited May 25, 2016).

²⁹ U.S. Census Bureau, 2007 NAICS Definitions, 517110 Wired Telecommunications Carriers, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch> (last visited May 25, 2016).

³⁰ 13 CFR § 121.201, NAICS Code 517110.

³¹ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, “Firms operated for the entire year,” http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

³² U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

³³ 5 U.S.C. § 601(3).

small incumbent LECs are not dominant in their field of operation because any such dominance is not “national” in scope.³⁴ The Commission has therefore included small incumbent LECs in this RFA analysis, although the Commission emphasizes that this RFA action has no effect on Commission analyses and determinations in other, non-RFA contexts.

14. *Interexchange Carriers.* Neither the Commission nor the SBA has developed a small business size standard specifically for providers of interexchange services. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers. This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception, establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.³⁵ In this category, the SBA deems a wired telecommunications carrier to be small if it has 1,500 or fewer employees.³⁶ Census data for 2007 shows 3,188 firms in this category.³⁷ Of these, 3,144 had fewer than 1,000 employees. On this basis, the Commission estimates that a substantial majority of the providers of wired telecommunications carriers are small.³⁸ Thus, under this category and the associated small business size standard, the Commission estimates that the majority of interexchange carriers are small entities that may be affected by our proposed action.³⁹

15. Neither the Commission nor the SBA has developed a small business size standard specifically for operator service providers. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees.⁴⁰ According to Commission data, 33 carriers have reported that they are engaged in the provision of operator services. Of these, an estimated 31 have 1,500 or fewer employees

³⁴ Letter from Jere W. Glover, Chief Counsel for Advocacy, SBA, to William E. Kennard, Chairman, FCC (filed May 27, 1999). The Small Business Act contains a definition of “small business concern,” which the RFA incorporates into its own definition of “small business.” 15 U.S.C. § 632(a); 5 U.S.C. § 601(3). SBA regulations interpret “small business concern” to include the concept of dominance on a national basis. 13 CFR § 121.102(b).

³⁵ U.S. Census Bureau, 2007 NAICS Definitions, 517110 Wired Telecommunications Carriers, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch> (last visited May 25, 2016).

³⁶ 13 CFR § 121.201, NAICS Code 517110.

³⁷ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, “Firms operated for the entire year,” http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

³⁸ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodType=table (last visited May 25, 2016).

³⁹ See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-skip=600&-ds_name=EC0751SSSZ5&-lang=en (last visited May 25, 2016).

⁴⁰ 13 CFR § 121.201, NAICS code 517110.

and 2 has more than 1,500 employees.⁴¹ Consequently, the Commission estimates that the majority of operator service providers are small entities that may be affected by our proposed action.

4. Wireless Providers – Fixed and Mobile

16. To the extent the wireless services listed below are used by wireless firms for fixed and mobile broadband Internet access services, the *NPRM*'s proposed rules may have an impact on those small businesses as set forth above and further below. Accordingly, for those services subject to auctions, we note that, as a general matter, the number of winning bidders that claim to qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service. Also, the Commission does not generally track subsequent business size unless, in the context of assignments and transfers or reportable eligibility events, unjust enrichment issues are implicated.

17. *Wireless Telecommunications Carriers (except Satellite)*. Since 2007, the Census Bureau has placed wireless firms within this new, broad, economic census category.⁴² Prior to that time, such firms were within the now-superseded categories of “Paging” and “Cellular and Other Wireless Telecommunications.”⁴³ Under the present and prior categories, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees.⁴⁴ For the category of Wireless Telecommunications Carriers (except Satellite), Census data for 2007, which supersede data contained in the 2002 Census, show that there were 1,383 firms that operated that year.⁴⁵ Of those 1,383, 1,368 had fewer than 100 employees, and 15 firms had more than 100 employees. Thus, under this category and the associated small business size standard, the majority of firms can be considered small. Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, Personal Communications Service (PCS), and Specialized Mobile Radio (SMR) Telephony services.⁴⁶ Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.⁴⁷ Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

18. *Wireless Communications Services*. This service can be used for fixed, mobile, radiolocation, and digital audio broadcasting satellite uses. The Commission defined “small business” for the wireless communications services (WCS) auction as an entity with average gross revenues of \$40 million for each of the three preceding years, and a “very small business” as an entity with average gross revenues of \$15 million for each of the three preceding years.⁴⁸ The SBA has approved these

⁴¹ Trends in Telephone Service, tbl. 5.3.

⁴² U.S. Census Bureau, 2007 NAICS Definitions, “Wireless Communications Carriers (Except Satellite), NAICS code 517210,” <http://www.census.gov/naics/2007/def/ND517210.HTM#N517210> (last visited May 25, 2016).

⁴³ U.S. Census Bureau, 2002 NAICS Definitions, “517211 Paging,” <http://www.census.gov/epcd/naics02/def/NDEF517.HTM> (last visited May 25, 2016); and also U.S. Census Bureau, 2002 NAICS Definitions, “517212 Cellular and Other Wireless Telecommunications,” <http://www.census.gov/epcd/naics02/def/NDEF517.HTM> (last visited May 25, 2016).

⁴⁴ 13 CFR § 121.201, NAICS code 517210 (2007 NAICS). The now-superseded, pre-2007 CFR citations were 13 CFR § 121.201, NAICS codes 517211 and 517212 (referring to the 2002 NAICS).

⁴⁵ U.S. Census Bureau, 2007 Economic Census, Sector 51, 2007 NAICS code 517210 (rel. Oct. 20, 2009), http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo=id=&-fds=name=EC0700A1&-skip=700&-ds=name=EC0751SSSZ5&-lang=en (last visited May 25, 2016).

⁴⁶ Trends in Telephone Service at Table 5.3.

⁴⁷ *See id.*

⁴⁸ *Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service (WCS)*, Report and Order, 12 FCC Rcd 10785, 10879, para. 194 (1997).

definitions.⁴⁹ The Commission auctioned geographic area licenses in the WCS service. In the auction, which commenced on April 15, 1997 and closed on April 25, 1997, seven bidders won 31 licenses that qualified as very small business entities, and one bidder won one license that qualified as a small business entity.

19. *1670–1675 MHz Services.* This service can be used for fixed and mobile uses, except aeronautical mobile.⁵⁰ An auction for one license in the 1670–1675 MHz band commenced on April 30, 2003 and closed the same day. One license was awarded. The winning bidder was not a small entity.

20. *Wireless Telephony.* Wireless telephony includes cellular, personal communications services, and specialized mobile radio telephony carriers. As noted, the SBA has developed a small business size standard for Wireless Telecommunications Carriers (except Satellite).⁵¹ Under the SBA small business size standard, a business is small if it has 1,500 or fewer employees.⁵² According to *Trends in Telephone Service* data, 413 carriers reported that they were engaged in wireless telephony.⁵³ Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.⁵⁴ Therefore, more than half of these entities can be considered small.

21. *Broadband Personal Communications Service.* The broadband personal communications services (PCS) spectrum is divided into six frequency blocks designated A through F, and the Commission has held auctions for each block. The Commission initially defined a “small business” for C- and F-Block licenses as an entity that has average gross revenues of \$40 million or less in the three previous calendar years.⁵⁵ For F-Block licenses, an additional small business size standard for “very small business” was added and is defined as an entity that, together with its affiliates, has average gross revenues of not more than \$15 million for the preceding three calendar years.⁵⁶ These small business size standards, in the context of broadband PCS auctions, have been approved by the SBA.⁵⁷ No small businesses within the SBA-approved small business size standards bid successfully for licenses in Blocks A and B. There were 90 winning bidders that claimed small business status in the first two C-Block auctions. A total of 93 bidders that claimed small business status won approximately 40 percent of the 1,479 licenses in the first auction for the D, E, and F Blocks.⁵⁸ On April 15, 1999, the Commission completed the re-auction of 347 C-, D-, E-, and F-Block licenses in Auction No. 22.⁵⁹ Of the 57 winning bidders in that auction, 48 claimed small business status and won 277 licenses.

⁴⁹ Letter from Aida Alvarez, Administrator, SBA, to Amy Zoslov, Chief, Auctions and Industry Analysis Division, Wireless Telecommunications Bureau, FCC (filed Dec. 2, 1998) (*Alvarez Letter 1998*).

⁵⁰ 47 CFR § 2.106; *see generally* 47 CFR §§ 27.1–.70.

⁵¹ 13 CFR § 121.201, NAICS code 517210.

⁵² *Id.*

⁵³ *Trends in Telephone Service*, tbl. 5.3.

⁵⁴ *Id.*

⁵⁵ *Amendment of Parts 20 and 24 of the Commission’s Rules – Broadband PCS Competitive Bidding and the Commercial Mobile Radio Service Spectrum Cap et al.*, Report and Order, 11 FCC Rcd 7824, 7850–52, paras. 57–60 (1996) (“*PCS Report and Order*”); *see also* 47 CFR § 24.720(b).

⁵⁶ *PCS Report and Order*, 11 FCC Rcd at 7852, para. 60.

⁵⁷ *See Alvarez Letter 1998*.

⁵⁸ *See Broadband PCS, D, E and F Block Auction Closes*, Public Notice, Doc. No. 89838 (rel. Jan. 14, 1997).

⁵⁹ *See C, D, E, and F Block Broadband PCS Auction Closes*, Public Notice, 14 FCC Rcd 6688 (WTB 1999). Before Auction No. 22, the Commission established a very small standard for the C Block to match the standard used for F Block. *Amendment of the Commission’s Rules Regarding Installment Payment Financing for Personal*

(continued....)

22. On January 26, 2001, the Commission completed the auction of 422 C and F Block Broadband PCS licenses in Auction No. 35. Of the 35 winning bidders in that auction, 29 claimed small business status.⁶⁰ Subsequent events concerning Auction 35, including judicial and agency determinations, resulted in a total of 163 C and F Block licenses being available for grant. On February 15, 2005, the Commission completed an auction of 242 C-, D-, E-, and F-Block licenses in Auction No. 58. Of the 24 winning bidders in that auction, 16 claimed small business status and won 156 licenses.⁶¹ On May 21, 2007, the Commission completed an auction of 33 licenses in the A, C, and F Blocks in Auction No. 71.⁶² Of the 12 winning bidders in that auction, five claimed small business status and won 18 licenses.⁶³ On August 20, 2008, the Commission completed the auction of 20 C-, D-, E-, and F-Block Broadband PCS licenses in Auction No. 78.⁶⁴ Of the eight winning bidders for Broadband PCS licenses in that auction, six claimed small business status and won 14 licenses.⁶⁵

23. *Specialized Mobile Radio Licenses.* The Commission awards “small entity” bidding credits in auctions for Specialized Mobile Radio (SMR) geographic area licenses in the 800 MHz and 900 MHz bands to firms that had revenues of no more than \$15 million in each of the three previous calendar years.⁶⁶ The Commission awards “very small entity” bidding credits to firms that had revenues of no more than \$3 million in each of the three previous calendar years.⁶⁷ The SBA has approved these small business size standards for the 900 MHz Service.⁶⁸ The Commission has held auctions for geographic area licenses in the 800 MHz and 900 MHz bands. The 900 MHz SMR auction began on December 5, 1995, and closed on April 15, 1996. Sixty bidders claiming that they qualified as small businesses under the \$15 million size standard won 263 geographic area licenses in the 900 MHz SMR band. The 800 MHz SMR auction for the upper 200 channels began on October 28, 1997, and was completed on December 8, 1997. Ten bidders claiming that they qualified as small businesses under the \$15 million size standard won 38 geographic area licenses for the upper 200 channels in the 800 MHz SMR band.⁶⁹ A second auction for the 800 MHz band was held on January 10, 2002 and closed on January 17, 2002 and included 23 BEA licenses. One bidder claiming small business status won five licenses.⁷⁰

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Communications Services (PCS) Licensees, WT Docket No. 97-82, Fourth Report and Order, 13 FCC Rcd 15743, 15768, para. 46 (1998).

⁶⁰ *C and F Block Broadband PCS Auction Closes; Winning Bidders Announced*, Public Notice, 16 FCC Rcd 2339 (2001).

⁶¹ *Broadband PCS Spectrum Auction Closes; Winning Bidders Announced for Auction No. 58*, Public Notice, 20 FCC Rcd 3703 (2005).

⁶² *Auction of Broadband PCS Spectrum Licenses Closes; Winning Bidders Announced for Auction No. 71*, Public Notice, 22 FCC Rcd 9247 (2007).

⁶³ *Id.*

⁶⁴ *Auction of AWS-1 and Broadband PCS Licenses Closes; Winning Bidders Announced for Auction 78*, Public Notice, 23 FCC Rcd 12749 (WTB 2008).

⁶⁵ *Id.*

⁶⁶ 47 CFR § 90.814(b)(1).

⁶⁷ *Id.*

⁶⁸ Letter from Aida Alvarez, Administrator, SBA, to Thomas Sugrue, Chief, Wireless Telecommunications Bureau, FCC (filed Aug. 10, 1999) (*Alvarez Letter 1999*).

⁶⁹ *Correction to Public Notice DA 96-586 “FCC Announces Winning Bidders in the Auction of 1020 Licenses to Provide 900 MHz SMR in Major Trading Areas,”* Public Notice, 18 FCC Rcd 18367 (WTB 1996).

⁷⁰ *Multi-Radio Service Auction Closes*, Public Notice, 17 FCC Rcd 1446 (WTB 2002).

24. The auction of the 1,053 800 MHz SMR geographic area licenses for the General Category channels began on August 16, 2000, and was completed on September 1, 2000. Eleven bidders won 108 geographic area licenses for the General Category channels in the 800 MHz SMR band and qualified as small businesses under the \$15 million size standard.⁷¹ In an auction completed on December 5, 2000, a total of 2,800 Economic Area licenses in the lower 80 channels of the 800 MHz SMR service were awarded.⁷² Of the 22 winning bidders, 19 claimed small business status and won 129 licenses. Thus, combining all four auctions, 41 winning bidders for geographic licenses in the 800 MHz SMR band claimed status as small businesses.

25. In addition, there are numerous incumbent site-by-site SMR licenses and licensees with extended implementation authorizations in the 800 and 900 MHz bands. We do not know how many firms provide 800 MHz or 900 MHz geographic area SMR service pursuant to extended implementation authorizations, nor how many of these providers have annual revenues of no more than \$15 million. In addition, we do not know how many of these firms have 1,500 or fewer employees, which is the SBA-determined size standard.⁷³ We assume, for purposes of this analysis, that all of the remaining extended implementation authorizations are held by small entities, as defined by the SBA.

26. *Lower 700 MHz Band Licenses.* The Commission previously adopted criteria for defining three groups of small businesses for purposes of determining their eligibility for special provisions such as bidding credits.⁷⁴ The Commission defined a “small business” as an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding \$40 million for the preceding three years.⁷⁵ A “very small business” is defined as an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than \$15 million for the preceding three years.⁷⁶ Additionally, the lower 700 MHz Service had a third category of small business status for Metropolitan/Rural Service Area (MSA/RSA) licenses—“entrepreneur”—which is defined as an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than \$3 million for the preceding three years.⁷⁷ The SBA approved these small size standards.⁷⁸ An auction of 740 licenses (one license in each of the 734 MSAs/RSAs and one license in each of the six Economic Area Groupings (EAGs)) commenced on August 27, 2002, and closed on September 18, 2002. Of the 740 licenses available for auction, 484 licenses were won by 102 winning bidders. Seventy-two of the winning bidders claimed small business, very small business or entrepreneur status and won a total of 329 licenses.⁷⁹ A second auction commenced on May 28, 2003, closed on June 13, 2003, and included 256 licenses: 5 EAG licenses and 476 Cellular Market Area licenses.⁸⁰ Seventeen winning bidders claimed small or very small business status and won 60 licenses, and nine winning

⁷¹ *800 MHz Specialized Mobile Radio (SMR) Service General Category (851–854 MHz) and Upper Band (861–865 MHz) Auction Closes; Winning Bidders Announced*, Public Notice, 15 FCC Rcd 17162 (2000).

⁷² *800 MHz SMR Service Lower 80 Channels Auction Closes; Winning Bidders Announced*, Public Notice, 16 FCC Rcd 1736 (2000).

⁷³ See generally 13 CFR § 121.201, NAICS code 517210.

⁷⁴ See *Reallocation and Service Rules for the 698–746 MHz Spectrum Band (Television Channels 52–59)*, Report and Order, 17 FCC Rcd 1022 (2002) (*Channels 52–59 Report and Order*).

⁷⁵ *Channels 52–59 Report and Order*, 17 FCC Rcd at 1087-88, ¶ 172.

⁷⁶ See *id.*

⁷⁷ See *id.*, 17 FCC Rcd at 1088, ¶ 173.

⁷⁸ *Alvarez Letter 1999*.

⁷⁹ *Lower 700 MHz Band Auction Closes*, Public Notice, 17 FCC Rcd 17272 (WTB 2002).

⁸⁰ *Lower 700 MHz Band Auction Closes*, Public Notice, 18 FCC Rcd 11873 (WTB 2003).

bidders claimed entrepreneur status and won 154 licenses.⁸¹ On July 26, 2005, the Commission completed an auction of 5 licenses in the Lower 700 MHz band (Auction No. 60). There were three winning bidders for five licenses. All three winning bidders claimed small business status.

27. In 2007, the Commission reexamined its rules governing the 700 MHz band in the *700 MHz Second Report and Order*.⁸² An auction of 700 MHz licenses commenced January 24, 2008 and closed on March 18, 2008, which included, 176 Economic Area licenses in the A Block, 734 Cellular Market Area licenses in the B Block, and 176 EA licenses in the E Block.⁸³ Twenty winning bidders, claiming small business status (those with attributable average annual gross revenues that exceed \$15 million and do not exceed \$40 million for the preceding three years) won 49 licenses. Thirty three winning bidders claiming very small business status (those with attributable average annual gross revenues that do not exceed \$15 million for the preceding three years) won 325 licenses.

28. *Upper 700 MHz Band Licenses*. In the *700 MHz Second Report and Order*, the Commission revised its rules regarding Upper 700 MHz licenses.⁸⁴ On January 24, 2008, the Commission commenced Auction 73 in which several licenses in the Upper 700 MHz band were available for licensing: 12 Regional Economic Area Grouping licenses in the C Block, and one nationwide license in the D Block.⁸⁵ The auction concluded on March 18, 2008, with 3 winning bidders claiming very small business status (those with attributable average annual gross revenues that do not exceed \$15 million for the preceding three years) and winning five licenses.

29. *700 MHz Guard Band Licensees*. In 2000, in the 700 MHz Guard Band Order, the Commission adopted size standards for “small businesses” and “very small businesses” for purposes of determining their eligibility for special provisions such as bidding credits and installment payments.⁸⁶ A small business in this service is an entity that, together with its affiliates and controlling principals, has average gross revenues not exceeding \$40 million for the preceding three years.⁸⁷ Additionally, a very small business is an entity that, together with its affiliates and controlling principals, has average gross revenues that are not more than \$15 million for the preceding three years.⁸⁸ SBA approval of these definitions is not required.⁸⁹ An auction of 52 Major Economic Area licenses commenced on September 6, 2000, and closed on September 21, 2000.⁹⁰ Of the 104 licenses auctioned, 96 licenses were sold to nine bidders. Five of these bidders were small businesses that won a total of 26 licenses. A second auction of 700 MHz Guard Band licenses commenced on February 13, 2001, and closed on February 21, 2001. All

⁸¹ See *id.*

⁸² *700 MHz Second Report and Order*, Second Report and Order, 22 FCC Rcd 15289, 15359 n. 434 (2007).

⁸³ *Auction of 700 MHz Band Licenses Closes*, Public Notice, 23 FCC Rcd 4572 (WTB 2008).

⁸⁴ *700 MHz Second Report and Order*, 22 FCC Rcd 15289.

⁸⁵ *Auction of 700 MHz Band Licenses Closes*, Public Notice, 23 FCC Rcd 4572 (WTB 2008).

⁸⁶ *Service Rules for the 746–764 MHz Bands, and Revisions to Part 27 of the Commission’s Rules*, Second Report and Order, 15 FCC Rcd 5299 (2000) (*746–764 MHz Band Second Report and Order*).

⁸⁷ *746–764 MHz Band Second Report and Order*, 15 FCC Rcd at 5343, para. 108.

⁸⁸ See *id.*

⁸⁹ See *id.* at 5343, para. 108 n.246 (for the 746–764 MHz and 776–794 MHz bands, the Commission is exempt from 15 U.S.C. § 632, which requires Federal agencies to obtain SBA approval before adopting small business size standards).

⁹⁰ *700 MHz Guard Bands Auction Closes: Winning Bidders Announced*, Public Notice, 15 FCC Rcd 18026 (WTB 2000).

eight of the licenses auctioned were sold to three bidders. One of these bidders was a small business that won a total of two licenses.⁹¹

30. *Air-Ground Radiotelephone Service.* The Commission has previously used the SBA's small business size standard applicable to Wireless Telecommunications Carriers (except Satellite), i.e., an entity employing no more than 1,500 persons.⁹² There are fewer than 10 licensees in the Air-Ground Radiotelephone Service, and under that definition, we estimate that almost all of them qualify as small entities under the SBA definition. For purposes of assigning Air-Ground Radiotelephone Service licenses through competitive bidding, the Commission has defined "small business" as an entity that, together with controlling interests and affiliates, has average annual gross revenues for the preceding three years not exceeding \$40 million.⁹³ A "very small business" is defined as an entity that, together with controlling interests and affiliates, has average annual gross revenues for the preceding three years not exceeding \$15 million.⁹⁴ These definitions were approved by the SBA.⁹⁵ In May 2006, the Commission completed an auction of nationwide commercial Air-Ground Radiotelephone Service licenses in the 800 MHz band (Auction No. 65). On June 2, 2006, the auction closed with two winning bidders winning two Air-Ground Radiotelephone Services licenses. Neither of the winning bidders claimed small business status.

31. *AWS Services (1710–1755 MHz and 2110–2155 MHz bands (AWS-1); 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz bands (AWS-2); 2155–2175 MHz band (AWS-3)).* For the AWS-1 bands, the Commission has defined a "small business" as an entity with average annual gross revenues for the preceding three years not exceeding \$40 million, and a "very small business" as an entity with average annual gross revenues for the preceding three years not exceeding \$15 million.⁹⁶ In 2006, the Commission conducted its first auction of AWS-1 licenses.⁹⁷ In that initial AWS-1 auction, 31 winning bidders identified themselves as very small businesses.⁹⁸ Twenty-six of the winning bidders identified themselves as small businesses.⁹⁹ In a subsequent 2008 auction, the Commission offered 35 AWS-1 licenses.¹⁰⁰ Four winning bidders identified themselves as very small

⁹¹ *700 MHz Guard Bands Auction Closes: Winning Bidders Announced*, Public Notice, 16 FCC Rcd 4590 (WTB 2001).

⁹² 13 CFR § 121.201, NAICS codes 517210.

⁹³ *Amendment of Part 22 of the Commission's Rules to Benefit the Consumers of Air-Ground Telecommunications Services et al.*, Order on Reconsideration and Report and Order, 20 FCC Rcd 19663, paras. 28–42 (2005).

⁹⁴ *Id.*

⁹⁵ Letter from Hector V. Barreto, Administrator, SBA, to Gary D. Michaels, Deputy Chief, Auctions and Spectrum Access Division, Wireless Telecommunications Bureau, FCC (filed Sept. 19, 2005).

⁹⁶ *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25,162, App. B (2003), modified by *Service Rules for Advanced Wireless Services In the 1.7 GHz and 2.1 GHz Bands*, Order on Reconsideration, 20 FCC Rcd 14,058, App. C (2005).

⁹⁷ *Auction of Advanced Wireless Services Licenses Scheduled for June 29, 2006; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction No. 66*, AU Docket No. 06-30, Public Notice, 21 FCC Rcd 4562 (2006) ("*Auction 66 Procedures Public Notice*").

⁹⁸ *Auction of Advanced Wireless Services Licenses Closes; Winning Bidders Announced for Auction No. 66*, Public Notice, 21 FCC Rcd 10,521 (2006) ("*Auction 66 Closing Public Notice*").

⁹⁹ *See id.*

¹⁰⁰ *AWS-1 and Broadband PCS Procedures Public Notice*, 23 FCC Rcd at 7499. Auction 78 also included an auction of broadband PCS licenses.

businesses, and three of the winning bidders identified themselves as a small business.¹⁰¹ For AWS-2 and AWS-3, although we do not know for certain which entities are likely to apply for these frequencies, we note that the AWS-1 bands are comparable to those used for cellular service and personal communications service. The Commission has not yet adopted size standards for the AWS-2 or AWS-3 bands but has proposed to treat both AWS-2 and AWS-3 similarly to broadband PCS service and AWS-1 service due to the comparable capital requirements and other factors, such as issues involved in relocating incumbents and developing markets, technologies, and services.¹⁰²

32. *3650–3700 MHz band.* In March 2005, the Commission released a *Report and Order and Memorandum Opinion and Order* that provides for nationwide, non-exclusive licensing of terrestrial operations, utilizing contention-based technologies, in the 3650 MHz band (i.e., 3650–3700 MHz).¹⁰³ As of April 2010, more than 1270 licenses have been granted and more than 7433 sites have been registered. The Commission has not developed a definition of small entities applicable to 3650–3700 MHz band nationwide, non-exclusive licensees. However, we estimate that the majority of these licensees are Internet Access Service Providers (ISPs) and that most of those licensees are small businesses.

33. *Fixed Microwave Services.* Microwave services include common carrier,¹⁰⁴ private-operational fixed,¹⁰⁵ and broadcast auxiliary radio services.¹⁰⁶ They also include the Local Multipoint Distribution Service (LMDS),¹⁰⁷ the Digital Electronic Message Service (DEMS),¹⁰⁸ and the 24 GHz Service,¹⁰⁹ where licensees can choose between common carrier and non-common carrier status.¹¹⁰ The Commission has not yet defined a small business with respect to microwave services. For purposes of the IRFA, the Commission will use the SBA's definition applicable to Wireless Telecommunications Carriers (except satellite)—i.e., an entity with no more than 1,500 persons is considered small.¹¹¹ For the category of Wireless Telecommunications Carriers (except Satellite), Census data for 2007, which supersede data contained in the 2002 Census, show that there were 1,383 firms that operated that year.¹¹² Of these, 1,368

¹⁰¹ *Auction of AWS-1 and Broadband PCS Licenses Closes, Winning Bidders Announced for Auction 78, Down Payments Due September 9, 2008, FCC Forms 601 and 602 Due September 9, 2008, Final Payments Due September 23, 2008, Ten-Day Petition to Deny Period*, Public Notice, 23 FCC Rcd 12,749 (2008).

¹⁰² *Service Rules for Advanced Wireless Services in the 1915–1920 MHz, 1995–2000 MHz, 2020–2025 MHz and 2175–2180 MHz Bands et al.*, Notice of Proposed Rulemaking, 19 FCC Rcd 19,263, App. B (2005); *Service Rules for Advanced Wireless Services in the 2155–2175 MHz Band*, Notice of Proposed Rulemaking, 22 FCC Rcd 17,035, App. (2007); *Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band*, Further Notice of Proposed Rulemaking, 23 FCC Rcd 9859, App. B (2008).

¹⁰³ The service is defined in section 90.1301 *et seq.* of the Commission's Rules, 47 CFR § 90.1301 *et seq.*

¹⁰⁴ 47 CFR Part 101, Subparts C and I.

¹⁰⁵ 47 CFR Part 101, Subparts C and H.

¹⁰⁶ Auxiliary Microwave Service is governed by Part 74 of Title 47 of the Commission's Rules. *See* 47 CFR Part 74. Available to licensees of broadcast stations and to broadcast and cable network entities, broadcast auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes mobile TV pickups, which relay signals from a remote location back to the studio.

¹⁰⁷ 47 CFR Part 101, Subpart L.

¹⁰⁸ 47 CFR Part 101, Subpart G.

¹⁰⁹ *See id.*

¹¹⁰ 47 CFR §§ 101.533, 101.1017.

¹¹¹ 13 CFR § 121.201, NAICS code 517210.

¹¹² U.S. Census Bureau, 2007 Economic Census, Sector 51, 2007 NAICS code 517210 (rel. Oct. 20, 2009),

had fewer than 100 employees, and 15 firms had more than 100 employees. Thus, under this category and the associated small business size standard, the majority of firms can be considered small. The Commission notes that the number of firms does not necessarily track the number of licensees. The Commission estimates that virtually all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition.

34. *Local Multipoint Distribution Service.* Local Multipoint Distribution Service (LMDS) is a fixed broadband point-to-multipoint microwave service that provides for two-way video telecommunications.¹¹³ In the 1998 and 1999 LMDS auctions,¹¹⁴ the Commission defined a small business as an entity that has annual average gross revenues of less than \$40 million in the previous three calendar years.¹¹⁵ Moreover, the Commission added an additional classification for a “very small business,” which was defined as an entity that had annual average gross revenues of less than \$15 million in the previous three calendar years.¹¹⁶ These definitions of “small business” and “very small business” in the context of the LMDS auctions have been approved by the SBA.¹¹⁷ In the first LMDS auction, 104 bidders won 864 licenses. Of the 104 auction winners, 93 claimed status as small or very small businesses. In the LMDS re-auction, 40 bidders won 161 licenses. Based on this information, the Commission believes that the number of small LMDS licenses will include the 93 winning bidders in the first auction and the 40 winning bidders in the re-auction, for a total of 133 small entity LMDS providers as defined by the SBA and the Commission’s auction rules.

35. *Broadband Radio Service and Educational Broadband Service.* Broadband Radio Service systems, previously referred to as Multipoint Distribution Service (MDS) and Multichannel Multipoint Distribution Service (MMDS) systems, and “wireless cable,” transmit video programming to subscribers and provide two-way high speed data operations using the microwave frequencies of the Broadband Radio Service (BRS) and Educational Broadband Service (EBS) (previously referred to as the Instructional Television Fixed Service (ITFS)).¹¹⁸ In connection with the 1996 BRS auction, the Commission established a small business size standard as an entity that had annual average gross revenues of no more than \$40 million in the previous three calendar years.¹¹⁹ The BRS auctions resulted in 67 successful bidders obtaining licensing opportunities for 493 Basic Trading Areas (BTAs). Of the 67 auction winners, 61 met the definition of a small business. BRS also includes licensees of stations authorized prior to the auction. At this time, we estimate that of the 61 small business BRS auction winners, 48 remain small business licensees. In addition to the 48 small businesses that hold BTA

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http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-_skip=700&-ds_name=EC0751SSSZ5&-_lang=en (last visited May 25, 2016).

¹¹³ Local Multipoint Distribution Service, *Second Report and Order*, 12 FCC Rcd 12545 (1997).

¹¹⁴ The Commission has held two LMDS auctions: Auction 17 and Auction 23. Auction No. 17, the first LMDS auction, began on February 18, 1998, and closed on March 25, 1998. (104 bidders won 864 licenses.) Auction No. 23, the LMDS re-auction, began on April 27, 1999, and closed on May 12, 1999. (40 bidders won 161 licenses.)

¹¹⁵ *LMDS Order*, 12 FCC Rcd at 12545.

¹¹⁶ *Id.*

¹¹⁷ See Letter to Daniel Phythyon, Chief, Wireless Telecommunications Bureau (FCC) from A. Alvarez, Administrator, SBA (Jan. 6, 1998).

¹¹⁸ *Amendment of Parts 21 and 74 of the Commission’s Rules with Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309(j) of the Communications Act—Competitive Bidding*, MM Docket No. 94-131, PP Docket No. 93-253, Report and Order, 10 FCC Rcd 9589, 9593, para. 7 (1995).

¹¹⁹ 47 CFR § 21.961(b)(1).

authorizations, there are approximately 392 incumbent BRS licensees that are considered small entities.¹²⁰ After adding the number of small business auction licensees to the number of incumbent licensees not already counted, we find that there are currently approximately 440 BRS licensees that are defined as small businesses under either the SBA or the Commission's rules. In 2009, the Commission conducted Auction 86, the sale of 78 licenses in the BRS areas.¹²¹ The Commission offered three levels of bidding credits: (i) a bidder with attributed average annual gross revenues that exceed \$15 million and do not exceed \$40 million for the preceding three years (small business) will receive a 15 percent discount on its winning bid; (ii) a bidder with attributed average annual gross revenues that exceed \$3 million and do not exceed \$15 million for the preceding three years (very small business) will receive a 25 percent discount on its winning bid; and (iii) a bidder with attributed average annual gross revenues that do not exceed \$3 million for the preceding three years (entrepreneur) will receive a 35 percent discount on its winning bid.¹²² Auction 86 concluded in 2009 with the sale of 61 licenses.¹²³ Of the ten winning bidders, two bidders that claimed small business status won 4 licenses; one bidder that claimed very small business status won three licenses; and two bidders that claimed entrepreneur status won six licenses.

36. In addition, the SBA's Cable Television Distribution Services small business size standard is applicable to EBS. There are presently 2,032 EBS licensees. All but 100 of these licenses are held by educational institutions. Educational institutions are included in this analysis as small entities.¹²⁴ Thus, we estimate that at least 1,932 licensees are small businesses. Since 2007, Cable Television Distribution Services have been defined within the broad economic census category of Wired Telecommunications Carriers; that category is defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies."¹²⁵ The SBA has developed a small business size standard for this category, which is: all such firms having 1,500 or fewer employees.

5. Satellite Service Providers

37. *Satellite Telecommunications Providers.* Two economic census categories address the satellite industry. The first category has a small business size standard of \$32.5 million or less in average

¹²⁰ 47 U.S.C. § 309(j). Hundreds of stations were licensed to incumbent MDS licensees prior to implementation of Section 309(j) of the Communications Act of 1934, 47 U.S.C. § 309(j). For these pre-auction licenses, the applicable standard is SBA's small business size standard of 1500 or fewer employees.

¹²¹ *Auction of Broadband Radio Service (BRS) Licenses, Scheduled for October 27, 2009, Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 86*, Public Notice, 24 FCC Rcd 8277 (2009).

¹²² *Id.* at 8296.

¹²³ *Auction of Broadband Radio Service Licenses Closes, Winning Bidders Announced for Auction 86, Down Payments Due November 23, 2009, Final Payments Due December 8, 2009, Ten-Day Petition to Deny Period*, Public Notice, 24 FCC Rcd 13572 (2009).

¹²⁴ The term "small entity" within SBREFA applies to small organizations (nonprofits) and to small governmental jurisdictions (cities, counties, towns, townships, villages, school districts, and special districts with populations of less than 50,000). 5 U.S.C. §§ 601(4)–(6). We do not collect annual revenue data on EBS licensees.

¹²⁵ U.S. Census Bureau, 2007 NAICS Definitions, "517110 Wired Telecommunications Carriers," (partial definition), www.census.gov/naics/2007/def/ND517110.HTM#N517110 (last visited May 25, 2016).

annual receipts, under SBA rules.¹²⁶ The second has a size standard of \$32.5 million or less in annual receipts.¹²⁷

38. The category of Satellite Telecommunications comprises firms “primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.”¹²⁸ The category has a small business size standard of \$32.5 million or less in average annual receipts, under SBA rules.¹²⁹ For this category, Census Bureau data for 2007 show that there were a total of 512 firms that operated for the entire year.¹³⁰ Of this total, 482 firms had annual receipts of less than \$25 million.¹³¹ Consequently, we estimate that the majority of satellite telecommunications providers are small entities.

39. The second category, i.e., “All Other Telecommunications” “comprises establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.”¹³² The SBA has developed a small business size standard for All Other Telecommunications, which consists of all such firms with annual receipts of \$ 32.5 million or less.¹³³ For this category, Census Bureau data for 2007 show that there were 2,383 firms that operated for the entire year.¹³⁴ Of those firms, a total of 2,346 had annual receipts less than \$25 million.¹³⁵ Consequently, we conclude that the majority of All Other Telecommunications firms can be considered small.

¹²⁶ 13 CFR § 121.201, NAICS code 517410.

¹²⁷ 13 CFR § 121.201, NAICS code 517919.

¹²⁸ U.S. Census Bureau, 2007 NAICS Definitions, “517410 Satellite Telecommunications”; <http://www.census.gov/naics/2007/def/ND517410.htm> (last visited May 25, 2016).

¹²⁹ 13 CFR § 121.201, NAICS code 517410.

¹³⁰ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ4, Information: Subject Series - Estab and Firm Size: Receipts Size of Firms for the United States: 2007, NAICS code 517410 http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodT ype=table (last visited May 25, 2016).

¹³¹ *Id.*

¹³² U.S. Census Bureau, North American Industry Classification System, Definition of “All Other Telecommunications,” NAICS code 517919, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch.htm> (last visited May 25, 2016).

¹³³ 13 CFR § 121.201, NAICS code 517919.

¹³⁴ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ4, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517919, “Firms operated for the entire year,” http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodT ype=table# (last visited May 25, 2016).

¹³⁵ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ4, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517919, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodT ype=table# (last visited May 25, 2016).

6. Cable Service Providers

40. Because Section 706 requires us to monitor the deployment of broadband regardless of technology or transmission media employed, we know that some broadband service providers do not provide voice telephony service. Accordingly, we describe below other types of firms that may provide broadband services, including cable companies, MDS providers, and utilities, among others.

41. *Wired Telecommunications Carriers.* This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies. Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. By exception, establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.¹³⁶ In this category, the SBA deems a wired telecommunications carrier to be small if it has 1,500 or fewer employees.¹³⁷ Census data for 2007 shows 3,188 firms in this category.¹³⁸ Of these, 3,144 had fewer than 1,000 employees. On this basis, the Commission estimates that a substantial majority of the providers of wired telecommunications carriers are small.¹³⁹

42. *Cable Companies and Systems.* The Commission has also developed its own small business size standards, for the purpose of cable rate regulation. Under the Commission's rules, a "small cable company" is one serving 400,000 or fewer subscribers nationwide.¹⁴⁰ Industry data indicate that all but ten cable operators nationwide are small under this size standard.¹⁴¹ In addition, under the Commission's rules, a "small system" is a cable system serving 15,000 or fewer subscribers.¹⁴² Industry data indicate that, of 6,101 systems nationwide, 4,410 systems have under 10,000 subscribers, and an additional 258 systems have 10,000-19,999 subscribers.¹⁴³ Thus, under this standard, most cable systems are small.

¹³⁶ U.S. Census Bureau, 2007 NAICS Definitions, 517110 Wired Telecommunications Carriers, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch.htm> (last visited May 25, 2016).

¹³⁷ 13 CFR § 121.201, NAICS Code 517110.

¹³⁸ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, "Firms operated for the entire year," http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodTtype=table (last visited May 25, 2016).

¹³⁹ U.S. Census Bureau, *2007 Economic Census of the United States*, Table EC0751SSSZ5, Information: Subject Series - Establishment and Firm Size: Receipts Size of Firms for the United States: 2007 NAICS Code 517110, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5&prodTtype=table (last visited May 25, 2016).

¹⁴⁰ 47 CFR § 76.901(e). The Commission determined that this size standard equates approximately to a size standard of \$100 million or less in annual revenues. *Implementation of Sections of the 1992 Cable Act: Rate Regulation*, Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408 (1995).

¹⁴¹ Broadcasting & Cable Yearbook 2010 at C-2 (2009) (data current as of Dec. 2008).

¹⁴² 47 CFR § 76.901(c).

¹⁴³ Television & Cable Factbook 2009 at F-2 (2009) (data current as of Oct. 2008). The data do not include 957 systems for which classifying data were not available.

43. *Cable System Operators.* The Communications Act of 1934, as amended, also contains a size standard for small cable system operators, which is “a cable operator that, directly or through an affiliate, serves in the aggregate fewer than 1 percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000.”¹⁴⁴ The Commission has determined that an operator serving fewer than 677,000 subscribers shall be deemed a small operator, if its annual revenues, when combined with the total annual revenues of all its affiliates, do not exceed \$250 million in the aggregate.¹⁴⁵ Industry data indicate that, of 1,076 cable operators nationwide, all but ten are small under this size standard.¹⁴⁶ We note that the Commission neither requests nor collects information on whether cable system operators are affiliated with entities whose gross annual revenues exceed \$250 million,¹⁴⁷ and therefore we are unable to estimate more accurately the number of cable system operators that would qualify as small under this size standard.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

44. The rules proposed in the Further Notice would require broadband Internet access providers and dedicated service providers as well as interconnected VoIP providers, to report outages or disruptions to communications according to specified metrics and thresholds, of at least 30 minutes. These providers as proposed, would need to specify when the outage is related unintended changes to or failures of software or firmware, unintended modifications to databases, or attributed to a critical network element. Reporting requirements would align the reporting process and timing with that of legacy reporting currently required in the part 4 rules.

45. Further, the rules proposed in the Further Notice would require interconnected VoIP service providers to submit Initial Reports, in addition to the Notifications and Final Reports currently required. These reporting requirements would align the reporting process and timing with that of legacy reporting currently required in the part 4 rules.

46. Moreover, the rules proposed in the Further Notice would require wireless and wireline providers to report outages that exceed proposed specified technical thresholds in the wireless radio access network and the wireline local access network respectively. The rules proposed in the Further Notice would also require wireless providers serving rural areas to file outage reports whenever one-third or more of its macro cell sites serving that area are disabled such that communications services cannot be handled through those sites, or are substantially impaired due to the outage(s) or other disruptions affecting those sites.

47. Under the Commission’s current outage reporting rules, which apply only to legacy circuit-switched voice and/or paging communications over wireline, wireless, cable, and satellite communications services and interconnected VoIP,¹⁴⁸ about 11,000 outage reports per year from all reporting sources combined are filed with the Commission. As a result of the rules proposed, we anticipate that fewer than 2,000 additional outage reports will be filed annually. Hence, we estimate that

¹⁴⁴ 47 U.S.C. § 543(m)(2); *see* 47 CFR § 76.901(f) & nn. 1–3.

¹⁴⁵ 47 CFR § 76.901(f); *see FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, Public Notice, 16 FCC Rcd 2225 (Cable Services Bureau 2001).

¹⁴⁶ *Broadcasting & Cable Yearbook 2006*, at A-8, C-2 (Harry A. Jessell ed., 2005) (data current as of June 30, 2005); *Television & Cable Factbook 2006*, at D-805 to D-1857 (Albert Warren ed., 2005).

¹⁴⁷ The Commission does receive such information on a case-by-case basis if a cable operator appeals a local franchise authority’s finding that the operator does not qualify as a small cable operator pursuant to § 76.901(f) of the Commission’s rules. *See* 47 CFR § 76.909(b).

¹⁴⁸ 47 CFR § 4.3.

if the proposed rules are adopted, the total number of reports from all outage reporting sources filed, pursuant to the current and proposed rules, combined would be fewer than 13,000 annually. We note that, occasionally, the proposed outage reporting requirements could require the use of professional skills, including legal and engineering expertise. As a consequence, we believe that in the usual case, the only burden associated with the proposed reporting requirements contained in this Further Notice would be the time required to complete the initial and final reports. We anticipate that electronic filing, through the type of template that we are proposing (similar to the type that other service providers currently subject to outage reporting requirements are employing) should minimize the amount of time and effort that will be required to comply with the rules that we propose in this proceeding.

48. The Further Notice's proposal to require outage reporting would be useful in refining voluntary best practices and in developing new ones. In each case for the reporting thresholds proposed, we have chosen specific circumstances, applicable to the specific service that, in our view, warrant reporting as a significant outage, leading to FCC analysis and, possibly, the application of existing best practices or the development and refinement of best practices in the future. There may be additional thresholds that should also be included to improve the process of developing and improving best practices. We encourage interested parties to address these issues in the context of the applicable technologies and to develop their comments in the context of ways in which the proposed information collection would facilitate best practices development and increased communications security, reliability and resiliency throughout the United States and its Territories.

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

49. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include (among others) the following four alternatives: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.¹⁴⁹

50. Over the past decade, the proportion of communications services provided over a broadband platform has increased dramatically, and the U.S. increasingly relies on broadband-based services not only for day-to-day consumer use but also for Homeland Defense and National Security. Over the past three years, the number of outages reported each year has remained relatively steady at about 11,000. We believe that the proposed outage reporting requirements are the minimum necessary to assure that we receive adequate information to perform our statutory responsibilities with respect to 911 services and ensure the reliability of communications and critical infrastructures. Also, we believe that the magnitude of the outages needed to trigger the proposed reporting requirements (e.g., outages of at least 30 minutes duration that potentially affect at least 900,000 user minutes) is set sufficiently high as to make it unlikely that small businesses would be impacted significantly by the proposed rules. We also believe the choice of performance-based, as opposed to design-based, degradation characteristics (e.g., packet loss and round-trip latency) and the corresponding thresholds chosen to trigger the outage reporting will not unduly burden smaller entities because of their objective, readily ascertainable nature. We have also carefully considered the notion of a waiver for small entities from coverage of the proposed rules, but declined to propose one, as a waiver of this type would unduly frustrate the purpose of the proposed requirements and run counter to the objectives of the Further Notice. Further, we believe that the proposed requirement that outage reports be filed electronically would significantly reduce the burdens and costs currently associated with manual filing processes.

¹⁴⁹ 5 U.S.C. § 603(c).

51. The proposed rules in the Further Notice are generally consistent with current industry practices, so the costs of compliance should be small. For a number of reasons, we believe that the costs of the reporting rules that we propose in the Further Notice are outweighed by the expected benefits (i.e., ensuring communications reliability through outage reporting, trend analysis and network best practice development and implementation). We have excluded from the proposed requirements any type of competitively sensitive information, information that would compromise network security, and information that would undermine the efficacy of reasonable network management practices. We anticipate that the record will suggest alternative ways in which the Commission could increase the overall benefits for, and lessen the overall burdens on, small entities.

52. We ask parties to include comments on possible alternatives that could satisfy the aims of the proceeding in cost-effective ways that do not overly burden providers, and we also seek comment on appropriate legal authority(ies) for the proposals under consideration. Moreover, we also seek comments on the relative costs and benefits associated with the proposed rules. We ask commenters to address particularly the following concerns: What are the costs, burdens, and benefits associated with any proposed rule? Entities, especially small businesses and small entities, more generally, are encouraged to quantify the costs and benefits of the proposed reporting requirements. How could any proposed rule be tailored to impose the least cost and the least amount of burden on those affected? What potential regulatory approaches would maximize the potential benefits to society? To the extent feasible, what explicit performance objectives should the Commission specify? How can the Commission best identify alternatives to regulation, including fees, permits, or other non-regulatory approaches?

53. Further, comments are sought on all aspects of this proposal, including the proposed extension of such requirements, the definitions and proposed reporting thresholds, and the proposed reporting process that would follow essentially the same approach that currently applies to outage reporting on legacy networks and services. We ask that commenters address whether the proposed rules would satisfy the Commission's intended aims, described herein, and would promote the reliability, resiliency and security of interconnected VoIP, broadband Internet access, and dedicated services. We also ask for comments on our tentative conclusions that: expanding part 4 outage reporting requirements currently applicable to interconnected VoIP service providers, and extending part 4 reporting to BIAS providers and dedicated service providers, (i) would allow the Commission to analyze outage trends related to those services; (ii) would provide an important tool for network operators to use in preventing future outages; and (iii) would help to enhance and ensure the resiliency and reliability of critical communications networks and services.

54. In sum, we welcome comments on: the proposed rules themselves; whether they would achieve their intended objectives; whether there are performance objectives not mentioned that we should address; whether better alternatives exist that would accomplish the proceeding's objectives; the legal premises for the actions contemplated; and the costs, burdens and benefits of our proposal.

F. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rule

55. None.

**STATEMENT OF
CHAIRMAN TOM WHEELER**

Re: *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration.*

Albert Einstein once said, "The only source of knowledge is experience." By Einstein's logic, the only way to know how best to ensure the reliability of our communications networks is to understand what happens when these networks fail. That is why the Commission is moving today to update our network outage reporting requirements.

Public safety is one of the enduring values that has always guided the Commission's policymaking, going back to our founding statute's call to promote "the safety of life and property." To that end, the Commission has worked to promote resilient, reliable, and secure communications networks across America. A key part of this effort has been our network outage reporting rules and the associated Network Outage Reporting System, or NORS.

For more than a decade, communications providers have kept the FCC apprised of major disruptions in their networks through these reporting requirements. The data have allowed staff to detect adverse outage trends, support providers' service restoration efforts, and coordinate with public safety officials during times of crisis. Information on so-called "sunny day" communications disruptions can also signal potentially deeper communications network problems. On the whole, these reports provide the FCC with a unique industry-wide view into communications outages that enables us to help make networks more reliable. This becomes even more important as critical infrastructure services rely increasingly on interconnected communications networks.

As technology evolves, our network outage reporting program must keep pace. In 2012, the Commission updated our rules to include outage reporting from interconnected VoIP providers. Still, the reporting requirements were adopted in an analog era and remain tailored primarily to legacy networks. This leaves us with two tasks: to bring legacy network reporting into today's digital era and to lay the groundwork for the broadband world. For example, 911 services are already increasingly reliant on IP-networks and transitioning to broadband-enabled Next Generation 911. Unless we update our rules, we risk losing critical visibility into the status of emergency communications in America. That is why in March 2015, the Commission approved a Notice of Proposed Rulemaking to explore additional updates to reflect new technologies.

Today's item adopts many of the proposals in the 2015 NPRM, refining our network outage reporting requirements to reflect the digital nature of today's networks and proposing common-sense updates in light of the transition to IP-based networks. The Further Notice of Proposed Rulemaking initiates a dialogue and seeks comment on ways to keep our reporting requirements current, whether for outages to emergency or non-emergency communications, so that we can continue to collectively safeguard the networks that American consumers and businesses rely upon.

Reviewing and, where appropriate, updating our rules to make sure they are keeping pace with technological advances and changing consumer preferences has been an agency-wide priority for the past several years. When the stakes are potentially life and death, as they are with public safety, it's imperative that we do so with our outage reporting rules. By helping us to learn from the experience of network disruptions, today's Order will help us know better how to make sure our networks are secure and reliable.

Thank you to the Public Safety and Homeland Security Bureau for their work on this item.

**STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN**

Re: *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration.*

Last week, as part of my #ConnectingCommunities tour, I had the privilege of visiting the Charleston County Consolidated 9-1-1 Center in North Charleston, South Carolina. I learned about their current implementation of text-to-911 – Charleston County has the distinction of being among the approximately eight percent of PSAPs nationwide with this capability – as well as their strategic plans for implementing Next Generation 9-1-1 service.

Like many other PSAPs in the country, Charleston County is considering implementing an Emergency Services IP Network or ESINet, as the foundation for the provisioning of Next Generation 9-1-1 service to its community. These broadband enabled networks support the transmission of very large data files, such as pictures and videos, the sharing of data between PSAPs, the transfer of operations to other 9-1-1 centers, and many other notable benefits.

Broadband networks and services, are the future of Next Generation 9-1-1, and accordingly, are critical to the nation's emergency preparedness and crises management. But our nation's reliance on broadband networks extends far beyond emergency services, with broadband being an essential tool for anyone who wants to fully engage in our connected society. Broadband is, as I often say, a connector to opportunities.

And as the nation's demand for broadband services increases, and providers continue to modify and improve their networks, it is imperative that the Commission's network outage reporting rules keep pace. The Report and Order and Further Notice aim to do just that. It is important to keep in mind, that the fundamental purpose of these rules is to collect and analyze data that could affect the nation's security, public health and economic well-being – information that the Commission has no means of gathering on a consistent and reliable basis from any other source. The data gathered by these reports helps providers, industry working groups, and Commission staff identify and address systemic vulnerabilities in order to improve network reliability and resiliency, and ideally, prevent future outages.

I applaud the providers' commitment to assist the Commission in the fulfillment of its fundamental statutory mandate to promote safety of life and property, by protecting the nation's communications networks. I also recognize that executing new reporting requirements takes time, planning and resources, which is why I asked for sensible timelines for implementation of the reporting obligations in the Report and Order, and clarity on acceptable methodologies for allocating capacity when an outage only affects some PSAPs served by a mobile switching center.

Many thanks are due to the staff of the Public Safety and Homeland Security Bureau for their hard work and continued dedication to ensuring that the nation's communications infrastructure is reliable, resilient and secure.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL**

Re: *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration.*

Two weeks ago, households and businesses across New York, Connecticut, Massachusetts, and Rhode Island were jolted into the pre-digital past when without any warning they lost access to Internet and phone service. The culprit was an accidental fiber cut, a mistake by a third-party contractor. It was hours before this situation was fixed. In the interim, it was hard to connect with family and friends. Binge watching was out. Routine activities that require access to the Internet were impossible. Businesses lost untold access to customers. But worse, public safety was affected—as an unknown number of customers were simply unable to dial 911.

What happened in the Northeast earlier this month is hardly unique. Last year, vandals in California destroyed fiber facilities, disrupting Internet access in San Francisco and Sacramento. Across the country in Florida, a construction error led to 14,000 broadband customers in Miami losing Internet service for hours. In Arizona, when an underground bundle of fiber-optic cables was maliciously cut in Flagstaff, cash machines went down, stores couldn't process credit cards, and emergency dispatch services were lost.

No matter where you live, when communications service shuts off, modern life grinds to a halt. This is not just inconvenient. It's a dangerous new vulnerability. It's a problem. But we cannot manage problems that we do not measure. That is why our action here is so important. We refine our existing rules for outage reporting in order to ensure that the data we receive is timely and accurate. Then we seek comment on outage reporting for consumer broadband service, because we need to understand communications vulnerabilities in order to address them. This public safety effort has my full and unequivocal support.

**STATEMENT OF
COMMISSIONER AJIT PAI,
CONCURRING IN PART AND DISSENTING IN PART**

Re: *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration.*

A year ago, the Commission unanimously adopted a Notice of Proposed Rulemaking that sought to modernize and streamline our outage reporting rules. We sought comment on targeted reforms that would eliminate unnecessary reporting obligations while requiring companies—including broadband providers—to submit useful information about actual outages that impact consumers. I supported the Notice because updating these rules would advance the Commission's core public safety mission and would focus the private sector's attention on getting consumers back online rather than filing unnecessary paperwork.

But somewhere between the Notice's good intentions and the document before us, this proceeding got way off track. Rather than focusing on outages that actually impact consumers, the Commission mandates that companies file reports even when their networks are fully functioning and no consumer is affected. Rather than requesting targeted outage information that would make it easier for the FCC to identify trends and threats, it requires a flood of new reports that will only make this task more difficult. Rather than promoting public safety and lowering costs for consumers, the item simply asserts that we're improving public safety and in fact raises costs.

Examples abound. Take what the Order refers to as a "simplex event." For those lucky enough not to be steeped in the arcane world of wireline, a simplex event occurs when a circuit loses one of its many redundant pathways. Given the circuit's design, a simplex event has no impact on the consumer. The traffic carried by that circuit is automatically re-routed. And, as the redacted record evidence shows, a simplex event isn't a signal of things to come; it doesn't herald additional or cascading network failures that would impact a consumer. Moreover, in the 911 context, the FCC doesn't require any outage report when re-routing is available. But rather than harmonize our rules and eliminate the unnecessary simplex reporting obligation, the FCC doubles down on it. It expands the number of simplex events that trigger reporting obligations—a step that even the Order concedes will result in hundreds upon hundreds of new reports each year. This is paperwork with no purpose.

The Further Notice of Proposed Rulemaking dives down similar rabbit holes. On the wireless side, the Commission does not limit its proposal to cell towers that are down. Instead, it tentatively concludes that providers must file outage reports when their towers are fully functional and operating at capacity. It does not matter if there are no call failures. It does not matter if excess demand never materializes. And it certainly does not matter if the report diverts resources that could be used to identify and repair actual outages. The Commission proposes that providers must nonetheless report that these towers are "out." Tellingly, it places the word "out" in quotation marks throughout this section, which just highlights its refusal to focus on actual outages.

The Further Notice's approach to broadband is another prime example. Instead of focusing on actual outages, it concludes that broadband providers should track and report on numerous metrics selected by the FCC—packet loss, latency, and throughput, among potentially many others—metrics that may have nothing to do with an outage or consumers' ability to use their broadband service. The Further Notice even suggests that broadband providers will be responsible for providing reports about facilities that they do not own, operate, lease, or use. This is a marked departure, and a bizarre distraction, from the goals of our outage reporting regime.

Indeed, in 2012, under then-Chairman Genachowski, the Commission unanimously rejected going down this road. It declined to require reports on packet loss, latency, and other metrics that don't

necessarily affect consumers.¹ Instead, it concluded that the agency would focus on outages that result in a “complete loss of service or connectivity.”² The Commission unanimously found that doing so would be “simpler,” more consistent with our outage reporting regime, and balance the agency’s need for outage reports with the burdens that our rules impose on providers and, in turn, consumers.³ I asked my colleagues to recommit to this bipartisan approach—an approach calibrated to the consumer experience and one far more likely to give us useful, targeted information. Unfortunately, the majority refused to support that request, if they bothered to respond at all.

Another major deficiency in this document is its cost-benefit analysis—or rather, the lack thereof. A meaningful discussion of costs and benefits is nowhere to be found in today’s decision. Indeed, the FCC focuses almost exclusively on the nation’s largest broadband providers—AT&T, Comcast, and Verizon, for instance—and suggests that those corporations are large enough to bear the costs imposed by our rules, however steep they may be. That might be true, and perhaps this reflects the market structure the majority would like to see—fewer providers and far more regulation. But there is virtually no consideration given to the thousands of small and mid-size providers who are critical to competition in these markets. Small cable operators, cellular companies, fixed wireless competitors, and others lack the army of lawyers and regulatory compliance departments that their larger competitors employ. Many of them have told the FCC that this top-heavy approach to outage reporting will siphon resources away from broadband deployment, slow genuine outage repair, and provide no benefit to consumers.⁴

And there is reason to believe that the regulatory costs will be quite high. At least one provider submitted a detailed, quantitative analysis of the costs associated with our reporting regime. While the FCC requires three separate reports for every outage or event, the analysis shows that it takes about a dozen hours to prepare and file just a single one of those reports. That’s nearly six times the number of hours the FCC includes in its cost estimate. So how does the agency respond to this data? How does it modify its cost-benefit analysis? It doesn’t. It simply asserts “we are not convinced that twelve hours are necessary.” Why is that exactly? What is the basis for this assertion? The agency offers no insight.

In the end, of course, none of this matters. This proceeding is not about actual outages that impact actual consumers. Nor is it about gathering targeted and useful information. It is about regulation for its own sake.

That’s a shame. There are concrete steps that we can and should be taking in this proceeding and in others, like the contraband cellphone docket, to promote public safety. Because we do not focus here on actual outages that impact consumers, I dissent from the bulk of today’s decision.

¹ See *Proposed Extension of Part 4 of the Commission’s Rules Regarding Outage Reporting to Interconnected Voice Over Internet Protocol Service Providers and Broadband Internet Service Providers*, Report and Order, 27 FCC Rcd 2650, 2686, para. 90 (2012).

² *Id.*

³ *Id.*

⁴ See, e.g., Letter from Jill Canfield, Vice President of Legal & Industry, NTCA—The Rural Broadband Association, to Marlene H. Dortch, Secretary, FCC, at 1 (May 16, 2016) (stating that the FCC’s proposals “would significantly increase the reporting burden on small carriers and consequently have a corresponding negative affect on their rural consumers”), <http://go.usa.gov/cJsNB>; Reply Comments of ITTA – The Voice of Mid-Size Communications Companies at 12 (July 31, 2015) (urging the FCC to “refrain from adopting unnecessary proposals that would increase burdens on providers without producing any tangible public safety benefit”), <http://go.usa.gov/cJsNY>; Letter from Rebecca Murphy Thompson, General Counsel, Competitive Carrier Association, to Marlene H. Dortch, Secretary, FCC, at 2 (July 16, 2015) (stating that the “benefits associated with the proposed rules will not ‘outweigh the costs of crippling carrier resources available to actually repair and restore communications facilities—especially if less onerous means of obtaining this information are available’”), <http://go.usa.gov/cJsNe>.

I concur, however, with two parts of the Order. First, I agree that we should eliminate the obsolete DS3-based reporting metric. And second, the Order now provides a more reasonable transition period for providers to comply with the new reporting requirements—a change that both Commissioner O’Rielly and I urged our colleagues to make. I only wish that we could have found more common ground, for common ground there was to be found.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY
CONCURRING IN PART, DISSENTING IN PART**

Re: *Amendments to Part 4 of the Commission's Rules Concerning Disruptions to Communications, PS Docket No. 15-80, ET Docket No. 04-35, PS Docket No. 11-82, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration.*

I have expressed concerns, in the past, about the Commission's reporting requirements,¹ because such reports tend to be gateways to even more costly regulations, even if industry ultimately "agrees" to the requirements. And while I remain skeptical of our Part 4 information collections, and any other efforts that place burdens on industry for the sake of just having information on hand or for such amorphous concepts as "network visibility" and "situational awareness," I am able to concur to today's order portion, because it does help clarify current rules and provides some relief for entities that fall under this reporting regime.

Further, edits that I proposed, along with Commissioners Pai and Clyburn, to ensure that industry has a reasonable time to implement the revised rules were accepted. And, the Chairman's office agreed to require that simplex outages would have to be reported within four days as opposed to three, which will reduce costs for all entities, but especially for small businesses. Additionally, edits were made at my request to those sections of the order and notice regarding the synchronization of the Part 4 reporting structure across all services. While the revised language does not go as far as I had hoped, the notice does seek comment on whether all services should have a two-step reporting requirement, as opposed to just proposing a three-step process.

Regrettably, this is about the only positive thing I can say about the substance of the Further Notice, which I strongly oppose. Yet again, the Commission predictably continues its power grab over the Internet by extending the outage reporting to so-called "Broadband Internet Access Services" (BIAS). From a statutory authority perspective this item represents quite an epic work of fiction. Over eight pages, the Commission uses the kitchen sink approach, invoking the CVAA; Title II, including section 254 implementing the Universal Service Fund; section 706; Title III and others to justify this proposal. Even section 4(o) is bandied about as a rationale for this travesty.² If only the Commission used the same level of effort to provide more thoughtful cost-benefit analyses.

Regardless of my well-known disagreement regarding our statutory authority over the Internet, some of the ideas teed up in this notice are just preposterous. For instance, BIAS providers may have to act as a "central reporting point" for outages occurring in Internet services, such as IP transport, that are outside of their control.³ It even goes so far as to make the outrageous suggestion that BIAS providers should enter into agreements that would enable them to acquire outage information that originates with other providers,⁴ who may, in some cases, be their competitor. What is the validity of the Commission "suggesting" revisions to privately negotiated agreements? And how would BIAS providers be compensated for these additional duties?

Generally, it is unclear what the Commission will do with all of this collected information about broadband networks. It seems likely that the Commission plans even more future regulation on the resiliency and reliability of the Internet, as the language in the notice is quite telling. In the section

¹ See *Improving Outage Reporting for Submarine Cables and Enhancing Submarine Cable Outage Data*, GN Docket No. 15-206, Notice of Proposed Rulemaking, 30 FCC Rcd 10492, 10526 (2015).

² See *supra* ¶¶ 193-212.

³ See *id.* ¶ 112.

⁴ See *id.*

regarding performance degradation and “general useful availability and connectivity,” which is code for not really an outage, the Commission asks “[s]hould we consider a metric measuring the average relative bandwidth, where providers would compare active bandwidth against the provider’s bandwidth [as] advertised or offered.”⁵ Further, in seeking comment about maintaining the confidentiality of these reports, the item states that “this approach of presumed confidentiality may need to evolve as networks, and consumer expectations about transparency, also evolve.”⁶ This suggests that this requirement would be used to further bolster the Net Neutrality transparency rule and/or as a means for the Enforcement Bureau to play a game of gotcha.

The notice also inquires into whether reports should include information about “unintended changes to software or firmware or unintended modifications to a database.”⁷ Once again, the Commission is trying to edge its way into the realm of cybersecurity, an area where the Commission does not have authority and other agencies, such as DHS, have jurisdiction and already engage with Internet providers about breaches. The Commission should not attempt to use reporting as a backdoor method to insert itself into the cyber debate.

Another utterly ridiculous idea is that providers would have to file an outage report in the case of congestion in either a wireless or wireline network. Yes, congestion, which occurs in fully functional communications networks, would be treated as an actual outage. One of the suggested reasons for this data collection is that such reports would allow the Commission to identify particular equipment that may be susceptible to failure during times of congestion.⁸ And, is the Commission going to “suggest” what network components providers should install or which equipment vendors are preferable? A similar theme is encountered in the section discussing VoIP outage reporting, where the Commission suggests that the current reporting regime has resulted in “significant gaps in the Commission’s visibility into such outages and hinders its ability to take appropriate remedial actions.”⁹ While the Commission can contact a VoIP and inquire about an outage, is the Commission going to tell them how to fix the problem? This is the ultimate fishing expedition, unglued from rationality or necessity.

Lastly, the cost-benefit analysis contained in this item is dreadful. Not only is the quantitative analysis and comparison of the costs and benefits for the modified and proposed reporting requirements insufficient, but the item summarily dismisses one industry participant’s assessment that it takes 11 to 12 hours to prepare and file an outage report.¹⁰ Frankly, I am more likely to believe the detailed analysis of those who actually file these reports as opposed to the Commission’s ethereal analysis that this only takes two hours.¹¹ Additionally, the cost-benefit assessments in no way take into account the time and cost of preparing networks and systems for these modified reporting requirements. Is there anyone who believes that it only takes two hours to compile and analyze data, prepare the reports and engage in multiple layers of review to ensure that a report is even required and that it is accurate?

For these reasons, and noting that the issues I raised with regard to the Notice are illustrative of the overall flawed approach, I must dissent in part.

⁵ *Id.* ¶ 136.

⁶ *Id.* ¶ 145.

⁷ *Id.* ¶¶ 122-128, 164.

⁸ *See id.* ¶ 175.

⁹ *Id.* ¶ 162.

¹⁰ *See* Comments of AT&T, PS Docket No. 15-80, at 3, 5-9 (July 16, 2015).

¹¹ *See supra* ¶ 91.