



REPORT TO CONGRESS

ON

CALLER ID AUTHENTICATION IMPLEMENTATION PROGRESS

**Prepared by the:
Wireline Competition Bureau**

**Submitted to the:
United States Congress pursuant to Section 4 of the Pallone-Thune Telephone Robocall Abuse
Criminal Enforcement and Deterrence Act**

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I. INTRODUCTION

In this Report, the Wireline Competition Bureau (Bureau) reports to Congress on progress made by voice service providers to implement caller ID authentication technology on their voice networks, as directed by section 4(b)(3) of the Pallone-Thune Telephone Robocall Abuse Criminal Enforcement and Deterrence (TRACED) Act.¹ To combat illegal caller ID spoofing, and consistent with the TRACED Act, the Commission has required that all voice service providers implement the STIR/SHAKEN caller ID authentication framework in their Internet Protocol (IP) networks and take reasonable measures to implement a caller ID authentication solution for non-IP networks by June 30, 2021.² And as directed by the TRACED Act,³ the Commission—via the Bureau—has exempted eligible voice service providers from these implementation mandates on the basis that they meet the early implementation benchmarks laid out in that Act.⁴ The Bureau now issues this Report, fulfilling congressional direction to report on these exemption determinations and voice service provider progress in implementing caller ID authentication technology.⁵

II. BACKGROUND

Unwanted calls are the number one consumer complaint to the Commission.⁶ Illegal robocalls accompanied by illegal caller ID spoofing—whereby bad actors falsify caller ID information to deceive call recipients into believing they are trustworthy—are particularly problematic; such calls are not only a nuisance but also expose Americans to fraudulent schemes.⁷ This problem has become even more relevant during this time of economic turmoil and pandemic, with bad actors preying on Americans’ fears about COVID-19 and spreading misinformation about false treatments and cures.⁸ The Commission has made tackling illegal robocalling and associated spoofing its top consumer protection priority and continues to work with a variety of stakeholders and government partners to end the scourge of illegal robocalls.⁹

¹ TRACED Act § 4(b)(3) (directing the Commission to provide “a report on [its exemption determinations], which shall include an analysis of the extent to which providers of voice service have implemented” the STIR/SHAKEN authentication framework in the Internet Protocol (IP) portion of their networks and an effective call authentication framework in the non-IP portion of their networks, “including whether the availability of necessary equipment and equipment upgrades has impacted such implementation; and an assessment of the efficacy of [STIR/SHAKEN and any effective non-Internet Protocol call authentication framework] in addressing all aspects of call authentication”).

² TRACED Act §§ 4(b)(1)(A)-(B); *Call Authentication Trust Anchor*, WC Docket No. 17-97, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 3241, 3252, paras. 24-25 (2020) (*First Report and Order and Further Notice*); *Call Authentication Trust Anchor*, WC Docket No. 17-97, Second Report and Order, FCC 20-136, at 13, para. 24 (Oct. 1, 2020) (*Second Report and Order*).

³ TRACED Act § 4(b)(2)

⁴ *Wireline Competition Bureau Announces Seven Voice Service Providers Qualified for STIR/SHAKEN Exemption*, WC Docket Nos. 17-97 and 20-68, Public Notice, DA 20-1533 (WCB Dec. 23, 2020) (*Exemption Determinations Public Notice*).

⁵ TRACED Act § 4(b)(3).

⁶ FCC, *The FCC’s Push to Combat Robocalls & Spoofing*, <https://www.fcc.gov/spoofed-robocalls> (last visited Nov. 23, 2020).

⁷ See *First Report and Order and Further Notice*, 35 FCC Rcd at 3263, para. 48 (estimating that fraudulent robocall schemes cost Americans an estimated \$10.5 billion annually).

⁸ See FCC, *COVID-19 Robocall Scams*, <https://www.fcc.gov/covid-19-robocall-scams> (last visited Nov. 23, 2020).

⁹ See, e.g., FCC, *Call Blocking Tools Now Substantially Available to Consumers: Report on Call Blocking* at 3 (2020), <https://docs.fcc.gov/public/attachments/DOC-365152A1.pdf> (*FCC Call Blocking Report*).

One part of the Commission’s multi-pronged approach to combatting illegal spoofing is caller ID authentication technology, and specifically the STIR/SHAKEN caller ID authentication framework.¹⁰ Caller ID authentication allows voice service providers to authenticate (when originating) and verify (when terminating) the caller ID information transmitted with phone calls.¹¹ Widespread implementation of caller ID authentication will reduce the effectiveness of illegal spoofing, allow law enforcement to identify bad actors more easily, and help voice service providers identify calls with illegally spoofed caller ID information before those calls reach their subscribers.¹²

STIR/SHAKEN. Technologists from the Internet Engineering Task Force and the Alliance for Telecommunications Industry Solutions (ATIS), both industry standards bodies, designed the STIR/SHAKEN framework, which allows voice service providers to authenticate and verify caller ID information for calls carried over IP networks.¹³ STIR/SHAKEN employs public key cryptography to securely transmit the information that the originating provider knows about the identity of the caller and the caller’s relationship to the phone number it is using.¹⁴ Providers transmit this information in an “Identity header” along with the call through the entire call path, which allows the terminating provider to verify the information on the other end.¹⁵

STIR/SHAKEN relies on digital “certificates” issued by a neutral governance system to authorized voice service providers to ensure trust. The voice service provider adding the Identity header includes its assigned certificate which says, in essence, that the voice service provider is the entity it claims to be and that it has the right to authenticate the caller ID information.¹⁶ The STIR/SHAKEN governance system consists of the Governance Authority, which defines the policies and procedures for which entities can issue or acquire certificates;¹⁷ the Policy Administrator, which applies those rules and confirms that voice service providers are authorized to request and receive certificates;¹⁸ and Certification Authorities, which issue the certificates themselves.¹⁹ After registering with, and receiving authorization

¹⁰ STIR/SHAKEN is an acronym which stands for Secure Telephone Identity Revisited—a working group formed by the Internet Engineering Task Force that produced several protocols for authenticating caller ID information—and Signature-based Handling of Asserted information using toKENs—a specification that standardizes how the protocols produced by STIR are implemented across the industry using digital “certificates.” See IETF, *Secure Telephone Identity Revisited (stir): About*, <https://datatracker.ietf.org/wg/stir/about> (last visited Dec. 8, 2020) (describing IETF STIR standards and efforts); ATIS & SIP Forum, Joint ATIS/SIP Forum Standard—Signature-Based Handling of Asserted Information Using toKENs (SHAKEN), ATIS-1000074 (2017), https://access.atis.org/apps/group_public/download.php/46770/ATIS-1000074-E.zip (ATIS-1000074).

¹¹ Neustar, *STIR/SHAKEN Q&A: Restoring Trust in Calls*, <https://www.home.neustar/resources/faqs/stir-shaken-q-and-a> (last visited Nov. 25, 2020).

¹² *Second Report and Order* at 3, para. 3.

¹³ Neustar, *STIR/SHAKEN Q&A: Restoring Trust in Calls*, <https://www.home.neustar/resources/faqs/stir-shaken-q-and-a> (last visited Nov. 25, 2020).

¹⁴ *Second Report and Order* at 5, para. 8.

¹⁵ *Id.*

¹⁶ *First Report and Order and Further Notice*, 35 FCC Rcd at 3246, para. 9.

¹⁷ This role is currently filled by the Secure Telephone Identity Governance Authority (STI-GA). Secure Telephone Identity Governance Auth., *STI Governance Authority*, <https://sti-ga.atis.org> (last visited Dec. 8, 2020).

¹⁸ The Governance Authority selected iconectiv to fill this role. Press Release, ATIS, Mitigating Illegal Robocalling Advances with Secure Telephone Identity Governance Authority Board’s Selection of iconectiv as Policy Administrator (May 30, 2019), <https://www.atis.org/press-releases/mitigating-illegal-robocalling-advances-with-secure-telephone-identity-governance-authority-boards-selection-of-iconectiv-as-policy-administrator>.

¹⁹ At the time of this Report, the Policy Administrator, iconectiv, has approved five certification authorities. See iconectiv, *Approved Certification Authorities*, <https://authenticate.iconectiv.com/approved-certification-authorities> (last visited Dec. 8, 2020).

from, the Policy Administrator, a voice service provider may receive its certificate from a Certification Authority and begin participating in the exchange of traffic with caller ID information that has been authenticated consistent with STIR/SHAKEN. Thus, to participate in STIR/SHAKEN, a voice service provider must not only complete necessary upgrades to its network infrastructure to be able to authenticate and verify caller ID information; it must also complete registration through the governance system.²⁰

Non-IP Caller ID Authentication. As the transition to all IP networks remains ongoing, many voice service providers continue to use legacy networks that cannot support IP-based SIP signaling, which is necessary for STIR/SHAKEN to function.²¹ Standards bodies are currently working on developing non-IP caller ID authentication solutions,²² and some vendors are developing potential solutions.²³ However, there is not yet an industry consensus on the path forward.²⁴ One technology currently in development is “out-of-band STIR.” While STIR/SHAKEN relies on caller ID authentication information transmitted *along with* the call throughout the call path, out-of-band STIR permits authentication information to be sent separately across the Internet, *out-of-band* from the call path.²⁵ Industry stakeholders have widely divergent views as to the viability of out-of-band STIR as a method of effective caller ID authentication in non-IP networks.²⁶

Commission Action to Date. The Commission has been promoting caller ID authentication and the STIR/SHAKEN framework for over three years. In July 2017, the Commission released a *Notice of Inquiry*, launching a broad examination of STIR/SHAKEN and how to expedite its development and implementation,²⁷ and in April 2018, the North American Numbering Council recommended a timeline and milestones for industry deployment of STIR/SHAKEN.²⁸

In June 2019, the Commission adopted a *Declaratory Ruling and Third Further Notice of Proposed Rulemaking* that, among other things, proposed and sought comment on mandating implementation of STIR/SHAKEN.²⁹ In December 2019, Congress enacted the TRACED Act, which directed the Commission to require, no later than June 30, 2021, all voice service providers to (1)

²⁰ See *Second Report and Order* at 56, para. 113; see also *First Report and Order and Further Notice*, 35 FCC Rcd at 3257, para. 32.

²¹ See *Second Report and Order* at 5, para. 9.

²² See Press Release, ATIS, ATIS Launches New Non-IP Call Authentication Task Force (May 13, 2020), <https://sites.atis.org/insights/atis-launches-new-non-ip-call-authentication-task-force>; IETF, *STIR Out-of-Band Architecture and Use Cases*, Draft (2019), <https://tools.ietf.org/html/draft-ietf-stir-oob-06> (draft standards for out-of-band STIR); see also, e.g., INCOMPAS Comments at 2; Lumen Comments at 4; USTelecom Reply at 3.

²³ See TransNexus, *Out-of-Band STIR/SHAKEN Call Authentication*, <https://transnexus.com/whitepapers/out-of-band-stir> (last visited Dec. 10, 2020).

²⁴ See, e.g., Comcast Comments, WC Docket Nos. 17-97 and 20-67, at 5 (rec. May 15, 2020).

²⁵ TransNexus, *Out-of-Band STIR/SHAKEN Call Authentication*, <https://transnexus.com/whitepapers/out-of-band-stir> (last visited Dec. 10, 2020).

²⁶ NTCA Comments at 9.

²⁷ *Call Authentication Trust Anchor*, WC Docket No. 17-97, Notice of Inquiry, 32 FCC Rcd 5988 (2017).

²⁸ Call Authentication Trust Anchor Working Grp., North American Numbering Council, Report on Selection of Governance Authority and Timely Deployment of SHAKEN/STIR (2018), http://nanc-chair.org/docs/mtg_docs/May_18_Call_Authentication_Trust_Anchor_NANC_Final_Report.pdf.

²⁹ *Advanced Methods to Target and Eliminate Unlawful Robocalls*; *Call Authentication Trust Anchor*, CG Docket No. 17-59 and WC Docket No. 17-97, Declaratory Ruling and Third Further Notice of Proposed Rulemaking, 34 FCC Rcd 4876 (2019).

implement STIR/SHAKEN in the IP portions of their networks and (2) take reasonable measures to implement an effective caller ID authentication framework in the non-IP portions of their networks.³⁰

On March 30, 2020, the Commission adopted a *Report and Order and Further Notice of Proposed Rulemaking (First Report and Order and Further Notice)* which required all voice service providers to implement STIR/SHAKEN in the IP portions of their networks by June 30, 2021, and proposed additional measures to combat illegal spoofing, including further implementation of the provisions of the TRACED Act related to caller ID authentication.³¹ On September 29, 2020, the Commission adopted a *Second Report and Order* which set forth additional rules to make clear the obligations and deadlines for voice service providers regarding caller ID authentication and completed implementation of the caller ID authentication provisions of the TRACED Act.³²

In the *Second Report and Order*, the Commission made two determinations particularly relevant to this Report. First, the Commission found that no effective caller ID authentication solution exists for non-IP networks.³³ The Commission explained that it will consider a non-IP caller ID authentication framework to be “effective” if it determines that it is (1) fully developed and finalized by industry standards, and (2) reasonably available such that the underlying equipment and software necessary to implement such a protocol is available on the commercial market.³⁴ The Commission found that “significant industry consensus is an important predicate to deeming a non-IP solution ‘effective.’”³⁵ Because the Commission found no effective solution for non-IP networks existed, it directed voice service providers to comply with the TRACED Act’s non-IP mandate by working to develop such a solution.³⁶

Second, the Commission established a process, consistent with the direction of section 4(b)(2) of the TRACED Act, to exempt voice service providers from the caller ID authentication implementation mandates if the Commission determines, by December 30, 2020, that such providers meet certain early implementation benchmarks.³⁷ The Commission interpreted the TRACED Act to create two exemptions—one for a voice service provider’s IP networks, and another for a voice service provider’s non-IP networks—and established criteria for each. To receive the IP exemption, a voice service provider must (i) have undertaken the network preparations necessary to deploy the STIR/SHAKEN protocols on its network; (ii) have completed formal registration (including payment) and testing with the Policy Administrator; (iii) have completed the necessary network upgrades to at least one network element to enable the authentication and verification of caller ID information consistent with the STIR/SHAKEN standards; and (iv) reasonably foresee that it will have completed all necessary network upgrades to its network infrastructure to be able to authenticate and verify caller ID information for all SIP calls exchanged with STIR/SHAKEN-enabled partners by June 30, 2021.³⁸ To receive the non-IP exemption, a voice service provider must (i) have been working to develop a non-IP authentication solution; and (ii) reasonably foresee that it will have completed all necessary network upgrades to its infrastructure to be

³⁰ TRACED Act § 4(b)(1).

³¹ *First Report and Order and Further Notice*, 35 FCC Rcd at 3246, para. 9.

³² *Second Report and Order*.

³³ *See id.* at 36, para. 68 n.269.

³⁴ *Id.* at 16, para. 32.

³⁵ *Id.* at 16, para. 31.

³⁶ *Id.* at 12-13, para. 24 (requiring voice service providers either to (1) completely upgrade its non-IP networks to IP and implement STIR/SHAKEN on its entire network, or (2) work to develop a non-IP authentication solution).

³⁷ TRACED Act § 4(b)(2).

³⁸ *See Second Report and Order* at 54-57, paras. 106-113.

able to authenticate and verify caller ID information for all non-IP calls originating or terminating on its network as provided by a standardized caller ID authentication framework for non-IP networks.³⁹

To receive either or both of the exemptions, a voice service provider was required to submit a certification by December 1, 2020, explaining, in detail, how the company has accomplished or is working to accomplish the prongs of the desired exemption.⁴⁰ On December 23, 2020, pursuant to its delegated authority, the Bureau issued a list of parties that filed complete compliance certifications and which will thus receive an exemption.⁴¹ Because the exemptions are, by their nature, based on a voice service provider's prediction of its future ability to implement caller ID authentication, those voice service providers that received an exemption will be required to file a second certification on a date after June 30, 2021 to be specified by the Bureau, stating whether they in fact achieved the implementation goal to which they previously committed.⁴²

Report Public Notice. On October 1, 2020, to facilitate preparation of this Report, the Bureau released a Public Notice seeking comment on “the extent to which providers of voice service have implemented caller ID authentication frameworks in the IP and non-IP portions of their networks and on the efficacy of those frameworks in addressing all aspects of caller ID authentication.”⁴³ We received comments from stakeholders representing voice service providers of various sizes and business models, as well as from ATIS.

III. REPORT

A. Exemption Determinations

The Bureau received exemption certifications from eight voice service providers. After reviewing those certifications, the Bureau released a Public Notice granting exemptions to seven of those voice service providers on the basis that each certified to meeting the implementation benchmarks. The Bureau granted exemptions to the following voice service providers: AT&T Services, Inc. (AT&T),⁴⁴ Bandwidth Inc. (Bandwidth), Charter Communications, Inc. (Charter), Comcast Cable Communications, LLC (Comcast), Cox Communications, Inc. (Cox), Cellco Partnership, d/b/a Verizon Wireless (Verizon Wireless), and Vonage Holding Corp (Vonage).⁴⁵ These voice service providers will need to make a subsequent filing no later than June 30, 2021, demonstrating that they met the implementation deadline. The Bureau declined to grant one requested exemption. The Bureau found that Nsight⁴⁶ did not qualify for the non-IP exemption on the grounds that it failed to meet either prong of the exemption.⁴⁷ Because the Bureau did not grant an exemption to Nsight, it must meet the implementation deadline of June 30, 2021, or a later date should it qualify for an extension.

³⁹ See *id.* at 57-58, paras. 114-116.

⁴⁰ See *id.* at 58-59, para. 118.

⁴¹ *Exemption Determinations Public Notice.*

⁴² *Second Report and Order* at 60, para. 121.

⁴³ See *Wireline Competition Bureau Invites Comment on Caller ID Authentication Progress for Report to Congress*, WC Docket No. 20-323, Public Notice, 35 FCC Rcd 10673 (WCB Oct. 1, 2020).

⁴⁴ Only AT&T's wireline network qualified for the exemption. See *Exemption Determinations Public Notice* at 2 n.10.

⁴⁵ *Exemption Determinations Public Notice* at 1.

⁴⁶ Nsight filed one certification on behalf of the following voice service providers: Bayland Telephone, LLC, Borderland Communications, LLC, Brown County C-LEC, LLC, Lakefield Telephone Company, LLC, Net Lec, LLC, Niagara Telephone Company, LLC, Northeast Telephone Company, LLC, and Nsighttel Wireless, LLC. See Nsight Certification and Supporting Statements for Exemption from Caller ID Authentication Requirements, WC Docket No. 20-68 (filed Dec. 1, 2020).

⁴⁷ *Exemption Determinations Public Notice* at 3.

B. Caller ID Authentication Implementation Progress

1. Implementation of STIR/SHAKEN in IP Networks

This section reports on the status of STIR/SHAKEN implementation among voice service providers based on information filed in the record, press releases, and exemption certifications. When reporting on the status of STIR/SHAKEN implementation among voice service providers, the Commission has previously divided voice service providers into three categories: (1) voice service providers that have implemented STIR/SHAKEN and began exchanging signed traffic with other voice service providers; (2) voice service providers that implemented STIR/SHAKEN but had not yet begun exchanging signed traffic with other voice service providers; and (3) voice service providers that had achieved limited, if any, progress towards upgrading their networks to support STIR/SHAKEN.⁴⁸ This Report likewise adopts those three categories to organize voice service providers by level of progress.

Voice Service Providers That Have Implemented STIR/SHAKEN and Are Exchanging Signed Traffic. At the time of this Report, the STIR/SHAKEN Policy Administrator lists 72 voice service providers that are authorized to participate in STIR/SHAKEN through the governance system.⁴⁹ This demonstrates progress by these providers toward the exchange of STIR/SHAKEN information with STIR/SHAKEN-enabled partners. A number of providers have also submitted filings stating that they had upgraded their networks to support STIR/SHAKEN, and are exchanging signed traffic: AT&T, Bandwidth, Charter, Comcast, Cox, Lumen (formerly CenturyLink), T-Mobile, Verizon, and Vonage.⁵⁰ Additionally, T-Mobile reports that UScellular is exchanging signed traffic.⁵¹ AT&T stated that it “signs all [VoLTE and consumer VoIP] calls originating on its network and, when signed caller ID authentication is received from another provider, AT&T verifies all such calls at termination,”⁵² and is

⁴⁸ See, e.g., *FCC Call Blocking Report* at 31-33; *First Report and Order and Further Notice*, 35 FCC Rcd at 3249-51, paras. 18-21.

⁴⁹ See iconectiv, *Authorized Service Providers*, <https://authenticate.iconectiv.com/authorized-service-providers-authenticate> (last visited Dec. 22, 2020) (listing approved voice service providers).

⁵⁰ See Letter from Linda S. Vandeloop, Assistant Vice President, Regulatory Affairs, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97, at 1 (filed Feb. 5, 2020) (*AT&T Ex Parte*); Letter from Greg Rogers, Head of Global Policy and Regulatory Affairs, Bandwidth, to Marlene H. Dortch, Secretary, FCC, CG Docket No. 17-59, WC Docket No. 17-97, at 1 (filed Jan. 31, 2020) (*Bandwidth Ex Parte*); Letter from Audrey Connors, Senior Director, Government Affairs, Charter Communications, to Hon. Ajit V. Pai, Chairman, FCC, WC Docket No. 17-97, at 1 (filed Dec. 13, 2019) (*Charter Ex Parte*); Letter from Beth Choroser, Vice President, Regulatory Affairs, Comcast Corporation, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97, CG Docket No. 17-59, at 2 (filed Jan. 31, 2020) (*Comcast Ex Parte*); Letter from Jenny Prime, Senior Director, Regulatory Affairs, Cox Enterprises, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97, at 1 (filed Jan. 27, 2020) (*Cox Ex Parte*); Lumen Comments at 2; Letter from Cathleen A. Massey, Vice President, Federal Regulatory Affairs, T-Mobile, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97, at 1 (filed Jan. 30, 2020) (*T-Mobile Ex Parte*); Letter from Joe Russo, Senior Vice President, Network Operations, Verizon, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97, at 1 (filed Feb. 7, 2020) (*Verizon Ex Parte*).

⁵¹ Press Release, T-Mobile, T-Mobile and UScellular Team up to Further Protect Customers from Scams and Spam (Nov. 19, 2020), <https://www.businesswire.com/news/home/20201119006099/en/CORRECTING-and-REPLACING-T-Mobile-and-UScellular-Team-Up-to-Further-Protect-Customers-from-Scams-and-Spam>. UScellular subsequently filed a request for an extension of the implementation deadline because “significant interconnection work with other carriers remains to be completed.” See Motion of U.S. Cellular for Extension of Time, WC Docket No. 17-97, at 2-3 (filed Nov. 20, 2020), <https://ecfsapi.fcc.gov/file/11202118425797/US%20Cellular%20FCC%20Motion%20for%20Extension%20of%20Time%20Dkt%20No.%2017-97%20as%20filed%2011-20-2020.pdf>. The Bureau is considering this and other extension requests and must make a determination by March 30, 2021. See *Second Report and Order* at 34, para. 65.

⁵² AT&T Comments at 2; Certification of AT&T Services, Inc. for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 5 (filed Dec. 1, 2020),

(continued....)

working to extend those capabilities to its business VoIP platform.⁵³ Bandwidth announced the exchange of authenticated traffic with both Comcast and T-Mobile,⁵⁴ and submitted an exemption certification stating that it is also currently upgrading its network as an intermediate provider to support STIR/SHAKEN.⁵⁵ Charter submitted an exemption certification stating that it had completed implementation of STIR/SHAKEN in December 2019, is exchanging authenticated traffic with Comcast and Altice, and is finalizing a peering arrangement with T-Mobile.⁵⁶ Comcast noted progress since 2019 in the number of partners with which it exchanges authenticated traffic, and also reported that it “had expanded deployment of STIR/SHAKEN beyond its residential voice customers to include its small- and medium-sized business voice customers.”⁵⁷ Cox submitted an exemption certification stating that, currently, “all outbound residential calls are authenticated, and all inbound calls are verified, with approximately 32% of residential inbound calls being authenticated by the originating carrier.”⁵⁸ Cox added that, “[f]or business customers the IP network transition is greater than 91% complete and the production implementation of STIR/SHAKEN is a few months from occurring.”⁵⁹

Lumen reported that it “is now signing all IP-originated calls originating from its internal communications network and is transiting signed call[s] to providers that are capable of receiving

<https://ecfsapi.fcc.gov/file/1201718409757/12.1.2020%20AT%26T%20Voluntary%20Implementation%20Exemption.pdf> (AT&T Exemption Certification).

⁵³ AT&T Comments at 2. AT&T subsequently filed a request for a one-year extension of the implementation deadline because it needs more time to “upgrad[e its] network capabilities and capacity to support STIR/SHAKEN on [legacy portions of its IP and VoLTE networks], as well as to establish, and migrate traffic to, new traffic routes that are STIR/SHAKEN-enabled.” Petition of AT&T for Extension of Implementation Deadline, WC Docket No. 17-97, at 2 (filed Nov. 20, 2020), <https://ecfsapi.fcc.gov/file/112141280138/11.20.2020%20Extension%20Request%20FINAL.pdf>.

⁵⁴ See Press Release, Bandwidth, Bandwidth Announces Successful STIR/SHAKEN Interop with T-Mobile (Mar. 25, 2020), <https://www.prnewswire.com/news-releases/bandwidth-announces-successful-stirshaken-interop-with-t-mobile-301029410.html>; Press Release, Bandwidth, Bandwidth Partners with Comcast to Reduce Robocalling with STIR/SHAKEN Call Protocols (Aug. 4, 2020), <https://www.prnewswire.com/news-releases/bandwidth-partners-with-comcast-to-reduce-robocalling-with-stirshaken-call-protocols-301105771.html>; Press Release, Bandwidth, Bandwidth Finalizes STIR/SHAKEN Interoperability with T-Mobile for Legacy Customers (Sept. 18, 2020), <https://finance.yahoo.com/news/bandwidth-finalizes-stir-shaken-interopability-125300431.html>.

⁵⁵ Certification of Bandwidth Inc. for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket Nos. 17-97 and 20-68, at 5 (filed Dec. 1, 2020), <https://ecfsapi.fcc.gov/file/12012226424304/Bandwidth%20Exemption%20Certification%20of%20Scott%20Mullen.pdf> (Bandwidth Exemption Certification).

⁵⁶ Certification of Charter Commc’ns for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 2 (filed Dec. 1, 2020), https://ecfsapi.fcc.gov/file/1201633424884/Charter%20STIR_SHAKEN%20Exemption%20Certification%2012-1-20.pdf (Charter Exemption Certification).

⁵⁷ Comcast Comments at 2; see also Certification of Comcast Cable Commc’ns, LLC for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 2-3 (filed Dec. 1, 2020), [https://ecfsapi.fcc.gov/file/12010797927937/Comcast%20-%20STIR-SHAKEN%20Compliance%20Certification%20\(2020.12.01\).pdf](https://ecfsapi.fcc.gov/file/12010797927937/Comcast%20-%20STIR-SHAKEN%20Compliance%20Certification%20(2020.12.01).pdf) (Comcast Exemption Certification). However, as of September 2020, only approximately 18 percent of all calls originating on other voice service providers’ networks and bound for Comcast’s residential subscribers had a STIR/SHAKEN-compliant header and were verified by Comcast. Comcast Comments at 2-3.

⁵⁸ Certification of Cox Commc’ns, Inc. for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 3 (filed Nov. 30, 2020), <https://ecfsapi.fcc.gov/file/1130081908555/Exemption%20Certification%2011.30.20.docx> (Cox Exemption Certification).

⁵⁹ *Id.*

them.”⁶⁰ Lumen further added that it is “currently conducting active testing with three (3) providers and has completed testing with three (3) additional providers.”⁶¹ T-Mobile announced that it began exchanging authenticated traffic with Sprint and UScellular.⁶² Verizon reported in its exemption certification that its “interconnection points with four service providers are now upgraded to pass the STIR/SHAKEN headers,” and that “[w]ork is ongoing with several more service providers.”⁶³ Verizon also reported in its comments that it has “begun signing for some enterprise customers.”⁶⁴ However, Verizon also revealed that it continues to face delays with respect to its Fios Digital Voice service, and expects to complete deployment on its wireline network in the first half of 2021.⁶⁵ Vonage submitted an exemption certification stating that its network “is already upgraded and able to authenticate and verify caller ID information for all SIP calls exchanged with STIR/SHAKEN-enabled partners, subject to continued testing to ensure full functionality and reliability.”⁶⁶ Additionally, Vonage stated that it has successfully tested STIR/SHAKEN caller ID authentication with its two largest peering partners.⁶⁷

Voice Service Providers That Have Implemented STIR/SHAKEN But Have Not Announced that They Have Begun Exchanging Signed Traffic. At the time of this Report, a variety of voice service providers have announced that they have completed implementation of STIR/SHAKEN but have not publicly indicated that they had begun exchanging authenticated traffic. Brightlink, a provider of multi-cloud management software offering voice and messaging communication applications and analytics, announced in February that it “now has STIR/SHAKEN authentication across its entire network.”⁶⁸ According to a July 2020 announcement, Buckeye Broadband, a cable and telecommunications provider serving customers in Ohio and Michigan, had deployed TNS Call Guardian, a call analytics solution that

⁶⁰ Lumen Comments at 2.

⁶¹ *Id.* Lumen also subsequently filed a request for a six-month extension of the implementation deadline “to accommodate the potential for specific equipment-related delays.” Request of Lumen for Extension, WC Docket No. 17-97, at 1 (filed Nov. 20, 2020), <https://ecfsapi.fcc.gov/file/112012406154/201120%20Lumen%20extension%20request%20WC17-97.pdf> (*Lumen Request for Extension*).

⁶² See Press Release, T-Mobile, Cross-Network STIR/SHAKEN Rollout Helps Stop Number-Spoofing, Keeping Consumers Safer from Scammers (Feb. 4, 2020), <https://www.t-mobile.com/news/tmobile-sprint-callerverified>; Press Release, T-Mobile and UScellular Team up to Further Protect Customers from Scams and Spam (Nov. 19, 2020), <https://www.businesswire.com/news/home/20201119006099/en/CORRECTING-and-REPLACING-T-Mobile-and-UScellular-Team-Up-to-Further-Protect-Customers-from-Scams-and-Spam>.

⁶³ Certification of Cellco Partnership, d/b/a Verizon Wireless, for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 3 (filed Dec. 1, 2020), <https://ecfsapi.fcc.gov/file/120141599338/12012020%20Verizon%20Certification.pdf> (Verizon Exemption Certification).

⁶⁴ Verizon Comments at 2.

⁶⁵ *Id.* at 3. Verizon also subsequently filed a request for a three-year extension of the implementation deadline regarding a “specific and limited” portion of its network because it needs more time to “implement[] STIR/SHAKEN on its FTTP-SIP platform.” Petition of Verizon for Declaratory Ruling or, in the Alternative, a Limited Extension of the STIR/SHAKEN Implementation Deadline, WC Docket No. 17-97, at 2-3 (filed Nov. 20, 2020), <https://ecfsapi.fcc.gov/file/11201014508317/2020%2011%2020%20Verizon%20Petition.pdf>.

⁶⁶ Certification of Vonage Holdings Corp. for Exemption from Caller ID Authentication Requirements on IP Networks, WC Docket No. 20-68, at 2 (filed Dec. 1, 2020), <https://ecfsapi.fcc.gov/file/1201229815992/Vonage%20Voluntary%20Implementation%20Exemption%20-%20FINAL-SIGNED.pdf> (Vonage Exemption Certification).

⁶⁷ *Id.*

⁶⁸ Press Release, Brightlink, Brightlink Takes on Robocalling with STIR/SHAKEN Solution (Feb. 26, 2020), <https://finance.yahoo.com/news/brightlink-takes-robocalling-stir-shaken-150000143.html>.

includes STIR/SHAKEN caller ID authentication.⁶⁹ Frontier reported in February that it “established the capability to authenticate and sign calls” and is in the negotiating and testing phase regarding authenticating traffic exchanged with other voice service providers.⁷⁰ According to a September announcement, Google’s Verified Calls service now integrates Neustar’s Trusted Call Solutions platform, providing digital signatures to calls through STIR/SHAKEN caller ID authentication.⁷¹ According to a November 2019 announcement, Inteliquent, along with T-Mobile and Comcast, completed end-to-end STIR/SHAKEN call verification across the three networks.⁷² Peerless Network, a provider of telecommunications services for enterprise and wholesale customers, announced in October 2019 that it had upgraded its network to be STIR/SHAKEN compliant.⁷³ Twilio, a cloud communications platform that enables phones, VoIP, and messaging to be embedded into web, desktop, and mobile software,⁷⁴ announced in April that it had begun signing enterprise calls using STIR/SHAKEN protocols.⁷⁵ Quality Voice & Data, a cloud-based telecom switching and VoIP services provider announced in May that it now meets requirements necessary to provide STIR/SHAKEN call attestation for its customers.⁷⁶ According to a May 2020 announcement, Viero Wireless, a US-based mobile network regional operator, will deploy TNS Call Guardian.⁷⁷ And Ytel, a software company which provides a communication platform allowing developers and businesses to build SMS and voice capabilities into various applications, announced in February that it “successfully completed one of the first STIR/SHAKEN signed and verified calls from [its] network.”⁷⁸

Voice Service Providers That Have Not Yet Announced They Have Implemented STIR/SHAKEN. TDS reported in January that it had completed work to evaluate, select, and lab-test a vendor solution to allow it to integrate STIR/SHAKEN in the IP portions of its network.⁷⁹ It explained at the time that it was

⁶⁹ See Press Release, Transaction Network Services, Buckeye Broadband Taps TNS Call Guardian in Battle Against Robocalls (July 30, 2020), <https://www.businesswire.com/news/home/20200730005120/en/Buckeye-Broadband-Taps-TNS-Call-Guardian-In-Battle-Against-Robocalls>.

⁷⁰ Letter from Diana Eisner, Director, Federal Regulatory, Frontier Commc’ns, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97 at 1 (filed Feb. 21, 2020).

⁷¹ Press Release, Neustar, Neustar Integrates with Google Verified Calls to Help Restore Trust in the Phone Channel (Sept. 8, 2020), <https://www.businesswire.com/news/home/20200908005802/en/Neustar-Integrates-with-Google-Verified-Calls-to-Help-Restore-Trust-in-the-Phone-Channel>.

⁷² See Press Release, T-Mobile, T-Mobile, Comcast and Inteliquent Deliver Industry First in War Against Illegal Call Spoofing (Nov. 21, 2019), <https://www.t-mobile.com/news/tmobile-comcast-inteliquent>.

⁷³ See Press Release, Peerless Network, Peerless Network Delivers, Exceeds SHAKEN/STIR Requirements (Oct. 9, 2019), <https://www.peerlessnetwork.com/peerless-network-delivers-exceeds-shaken-stir-requirements>.

⁷⁴ See Twilio, *About*, <https://www.twilio.com/company> (last visited May 4, 2020).

⁷⁵ See Press Release, Twilio, Twilio Begins Signing Enterprise Calls Using SHAKEN/STIR Protocols to Help Stop Illegal Robocalls for Business Users (April 8, 2020), <https://finance.yahoo.com/news/twilio-begins-signing-enterprise-calls-130000912.html>.

⁷⁶ See Press Release, Quality Voice & Data, Quality Voice & Data Attains Authorized SHAKEN Service Provider Status (May 26, 2020), <https://www.prnewswire.com/news-releases/quality-voice--data-attains-authorized-shaken-service-provider-status-301064069.html>.

⁷⁷ See Press Release, Transaction Network Services, Viero Wireless Selects TNS Call Guardian for Robocall Protection (May 12, 2020), <https://www.businesswire.com/news/home/20200512005078/en/Viero-Wireless-Selects-TNS-Call-Guardian-for-Robocall-Protection>.

⁷⁸ Press Release, Ytel, Ytel Completes One of the First STIR/SHAKEN Calls from CPaaS Platform (Feb. 27, 2020), https://www.prweb.com/releases/ytel_completes_one_of_the_first_stir_shaken_calls_from_cpaaS_platform/prweb16942695.htm.

⁷⁹ See Letter from Sara Cole, Regulatory Counsel, TDS Telecommc’ns, LLC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 17-97 at 1 (rec. Jan. 30, 2020) (TDS *Ex Parte*).

in the process of developing implementation plans, but because many of its interconnection points with other voice service providers are not IP-enabled, it “forecast[ed] that only a small percentage of traffic will be exchanged in IP when SHAKEN/STIR is initially deployed in the TDS IP network.”⁸⁰ RedShift Networks, a provider of cybersecurity solutions for enterprises, global carriers, and cloud communications operators, announced that it had completed interoperability testing of STIR/SHAKEN with the ATIS Robocalling Testbed.⁸¹ USA Digital Communications, Inc., a provider of commercial enterprise data and voice solutions, announced that it had received authorization by the Policy Administrator to receive STIR/SHAKEN certificates.⁸² A few other entities also announced progress toward implementation of STIR/SHAKEN.⁸³

Additional Update of Note. On November 23, 2020, Comcast, Everbridge, NetNumber, Numeracle, and Twilio announced that they completed the first-ever telephone call that combines authenticated caller ID with “Rich Call Data.”⁸⁴ Both ATIS and the Internet Engineering Task Force are finalizing work on draft standards for Rich Call Data,⁸⁵ which “allows legitimate callers to tell recipients exactly who they are, where they’re calling from, and even why they are calling, with the highest degree of trust and certainty.”⁸⁶ With Rich Call Data, voice service providers can “display . . . the Verified Identity of the . . . caller via Caller ID Name, brand logo, and call reason” to the end consumer, giving the consumer more information to consider in deciding whether to accept the call.⁸⁷

2. Implementation of Caller ID Authentication in Non-IP Networks

The TRACED Act also requires us to report on the extent to which voice service providers have implemented an effective caller ID authentication framework in their non-IP networks.⁸⁸ As noted earlier, in the *Second Report and Order* the Commission found that no caller ID authentication framework is

⁸⁰ *Id.*

⁸¹ Press Release, Redshift Networks, Redshift Networks Completes Successful Interoperability Testing of STIR/SHAKEN Anti-Robocall Solution with the ATIS Robocalling Testbed (Nov. 19, 2020), https://www.prweb.com/releases/redshift_networks_completes_successful_interoperability_testing_of_stir_shaken_anti_robocall_solution_with_the_atis_robocalling_testbed/prweb17555330.htm.

⁸² See Press Release, USA Digital Comm’ns, Inc., USA Digital Receives Policy Administrator Authorization (June 30, 2020), <https://www.prnewswire.com/news-releases/usa-digital-receives-policy-administrator-authorization-301086110.html>.

⁸³ See, e.g., Dave Warner, *Little Falls Company Joins Exclusive Club*, My Little Falls (Nov. 19, 2020), <https://mylittlefalls.com/little-falls-company-joins-exclusive-club>; Press Release, Sangoma Tech. Corp., Sangoma Announces Asterisk 18, Kicking Off AstriCon, the Annual Asterisk User Group Conference (Oct. 20, 2020), <https://www.prnewswire.com/news-releases/sangoma-announces-asterisk-18-kicking-off-astricon-the-annual-asterisk-user-group-conference-301156018.html>.

⁸⁴ Press Release, Comcast et al., Technology Companies Complete First-Ever Telephone Call with Authenticated Caller ID and Rich Call Data, Powered by STIR/SHAKEN (Nov. 23, 2020), <https://www.businesswire.com/news/home/20201123005376/en/Technology-Companies-Complete-First-Ever-Telephone-Call-with-Authenticated-Caller-ID-and-Rich-Call-Data-Powered-by-STIRSHAKEN>.

⁸⁵ ATIS, Signature-based Handling of Asserted Information Using toKENs (SHAKEN: Calling Name and Rich Call Data Handling Procedures, ATIS-1000XXX, https://access.atis.org/apps/group_public/download.php/45828/IPNNI-2019-00024R000.docx; Internet Eng’g Task Force, PASSporT Extension for Rich Call Data (Nov. 16, 2020), https://datatracker.ietf.org/doc/draft-ietf-stir-passport-rcd/?include_text=1.

⁸⁶ Press Release, Comcast et al., Technology Companies Complete First-Ever Telephone Call with Authenticated Caller ID and Rich Call Data, Powered by STIR/SHAKEN (Nov. 23, 2020), <https://www.businesswire.com/news/home/20201123005376/en/Technology-Companies-Complete-First-Ever-Telephone-Call-with-Authenticated-Caller-ID-and-Rich-Call-Data-Powered-by-STIRSHAKEN>.

⁸⁷ *Id.*

⁸⁸ TRACED Act § 4(b)(3).

“effective” because there is not yet a standardized solution.⁸⁹ Industry continues to work on developing a solution. ATIS explains that it formed the Non-IP Call Authentication Task Force on June 1, 2020 to investigate the issue of caller ID authentication over non-IP networks.⁹⁰ It reported that the task force “has received a significant number of contributions from members proposing mechanisms that could support non-IP call authentication.”⁹¹ These contributions fall into two broad categories: a solution that operates out-of-band, and a solution that works in-band on TDM technology.⁹² One commenter expressed support for out-of-band STIR as a promising solution that is still in development.⁹³ Another commenter reported that “several voice service providers [are] using Out-of-Band SHAKEN in their production networks today[,] including Brightlink, New Lisbon Telephone Company, and Wabash Communications.”⁹⁴ At least one stakeholder argues that until the Commission determines that an effective non-IP solution exists, call analytics can be a substitute for caller ID authentication over time-division-multiplexed networks.⁹⁵

C. Impact of Equipment Availability

The TRACED Act requires that the Commission report on “whether the availability of necessary equipment and equipment upgrades has impacted” the implementation of STIR/SHAKEN and an effective non-IP caller ID authentication framework.⁹⁶ In response to the Public Notice seeking comment on this topic, no commenter filed comments stating that it has experienced equipment availability issues, nor did any commenter suggest that equipment availability would have or has had an impact on implementing a non-IP caller ID authentication solution. Regarding STIR/SHAKEN, Lumen, noted that “it is possible that issues may arise related to equipment availability—software updates, in particular—that could delay Lumen’s implementation timeline.”⁹⁷ Lumen added that, because “software releases and associated testing is a complex and iterative process with interdependencies that cannot always be anticipated in advance[, t]hese interdependencies have the potential to impact Lumen’s deployment timeline particularly if additional hardware or software ends up being required.”⁹⁸ USTelecom stated its belief that equipment availability is an issue that “will be responsible for slowing STIR/SHAKEN deployment progress” by small voice service providers.⁹⁹

⁸⁹ See *Second Report and Order* at 36, para. 68 n.269; see also *id.* at 15-16, para. 31.

⁹⁰ Letter from Thomas Goode, General Counsel, ATIS, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 20-323, at 2 (Oct. 27, 2020) (*ATIS Ex Parte*).

⁹¹ *Id.*

⁹² *Id.*

⁹³ See NTCA Comments at 9; see also Transaction Network Services, Inc. Comments, CG Docket No. 17-59, WC Docket No. 17-97, at 15-16 (rec. July 24, 2019) (TNS July 24, 2019 Comments).

⁹⁴ Letter from Jim Dalton, CEO, TransNexus, to Marlene H. Dortch, Secretary, FCC, WC Docket Nos. 17-97 and 20-67, at 1-2 (July 23, 2020).

⁹⁵ Lumen Comments at 5 (“Call analytics programs can provide another layer of protection against illegal robocalls that is particularly applicable for TDM networks. These steps should be considered a reasonable proxy for call authentication as development work for solutions on non-IP networks continues.”).

⁹⁶ TRACED Act § 4(b)(3)(A).

⁹⁷ Lumen Comments at 3.

⁹⁸ *Id.* Lumen subsequently filed a request for a six-month extension of the implementation deadline on the basis that such an extension would allow it to “accommodate any . . . specific equipment-related potential delays to the extent needed to implement STIR/SHAKEN.” *Lumen Request for Extension* at 7. The Bureau is considering this request and must make a determination by March 30, 2021. See *Second Report and Order* at 34, para. 65.

⁹⁹ USTelecom Reply at 3.

In March of 2020, the Commission sought comment in the *Further Notice* about the burdens and barriers to implementation presented by equipment availability and cost.¹⁰⁰ In response, the Commission received comments that claimed that equipment availability issues specifically impact small voice service providers.¹⁰¹ Commenters claimed that such voice service providers often rely on third-party vendor solutions—particularly software solutions—to implement STIR/SHAKEN, and these solutions may be prohibitively expensive for some small voice service providers.¹⁰² While commenters pointed to high upfront costs with limited transparency, they also claimed that as medium and large voice service providers start to deploy STIR/SHAKEN widely, new and improved solutions may emerge, increasing competition among vendors and decreasing costs.¹⁰³

Based on the record developed in response to the March *Further Notice*, the Commission concluded in its *Second Report and Order* that it was unnecessary to grant an extension solely on the basis of an inability to purchase or upgrade equipment to support caller ID authentication, or lack of availability of such equipment.¹⁰⁴ It found that its extension for small voice service providers “adequately addresses challenges with regard to obtaining necessary equipment.”¹⁰⁵ In fact, the Commission granted the small voice service provider extension “to allow small voice service providers sufficient time to address challenges such as equipment cost and availability.”¹⁰⁶ It reasoned that additional time will allow voice service providers confronted with budget shortages to spread costs over a longer time horizon.¹⁰⁷ Further, the Commission concluded that an extension will allow vendors that work with small voice service providers more time to develop solutions and offer those solutions at a lower cost as the market matures.¹⁰⁸

We thus conclude, in light of the record developed both for the *Second Report and Order* and this Report, that it is reasonably possible that equipment availability may pose hurdles to the deployment of STIR/SHAKEN. We expect that any such hurdles would particularly affect small voice service providers. At the time of this Report, we have not received any reports of equipment availability issues actually impacting voice service providers, but we will continue to monitor this issue.

D. Efficacy of Caller ID Authentication Frameworks

The TRACED Act requires that the Commission provide “an assessment of the efficacy of” STIR/SHAKEN and any effective non-IP caller ID authentication framework that the Commission requires voice service providers to implement by the June 30, 2021 deadline, in “addressing all aspects of call authentication.”¹⁰⁹ Absent widespread implementation of either STIR/SHAKEN or a non-IP caller ID authentication framework, such an assessment is difficult, if not impossible.¹¹⁰ Because of the

¹⁰⁰ See *First Report and Order and Further Notice*, 35 FCC Rcd at 3275, para. 73.

¹⁰¹ *Second Report and Order* at 19, para. 42.

¹⁰² *Id.*

¹⁰³ *Id.* at 20, para. 42.

¹⁰⁴ *Id.* at 28-29, para. 57.

¹⁰⁵ *Id.*

¹⁰⁶ *Id.* at 20, para. 43.

¹⁰⁷ *Id.* at 21, para. 43.

¹⁰⁸ *Id.*

¹⁰⁹ TRACED Act § 4(b)(3)(B).

¹¹⁰ See, e.g., AT&T Comments at 5-6 (“The ongoing implementation and development of STIR/SHAKEN thus present an obstacle to any evaluation of the present efficacy of STIR/SHAKEN. Drawing conclusions about STIR/SHAKEN’s efficacy at this juncture necessarily would rely on assumptions rather than actual experience with the protocols’ operation across the voice ecosystem. . . . AT&T urges that any definitive judgment rendered with

(continued....)

STIR/SHAKEN framework’s design, the greater the number of voice service providers that implement it, the more effective it will be in combating illegal robocalls, and the more the expected benefits will be realized.¹¹¹ The record supports the conclusion that it is premature to evaluate the efficacy of STIR/SHAKEN at this time.¹¹² We agree with AT&T’s assertion that “[t]he ongoing implementation and development of STIR/SHAKEN . . . present an obstacle to any evaluation of the present efficacy of STIR/SHAKEN. Drawing conclusions about STIR/SHAKEN’s efficacy at this juncture necessarily would rely on assumptions rather than actual experience with the protocols’ operation across the voice ecosystem.”¹¹³

While it may be premature to assess the efficacy of STIR/SHAKEN in practice, we can report on the efficiency of its design and progress made toward resolving certain specific identified issues in the record that may impact its efficacy. There is broad industry consensus that STIR/SHAKEN is well-designed,¹¹⁴ and the record has produced no compelling reason to come to a different conclusion. Evidence also suggests that STIR/SHAKEN, where implemented, is working as intended and is a useful tool in reducing instances of illegal robocalls, informing labeling, and conducting tracebacks.¹¹⁵

Commenters also agree that STIR/SHAKEN paired with other tools, such as call analytics, may increase its efficacy.¹¹⁶ As the Commission noted in its *First Report and Order and Further Notice*, pairing caller ID authentication with call analytics may be a powerful and effective tool to protect American consumers from fraudulent robocall schemes.¹¹⁷ Recognizing the benefits of both technologies

respect to the efficacy of STIR/SHAKEN should be based on the results of the protocols in operation on a broad scale. AT&T thus believes for these and other reasons that it is premature to make any concrete findings regarding the efficacy of STIR/SHAKEN.”)

¹¹¹ *Second Report and Order* at 14, para. 27; *see also, e.g.*, AT&T Comments, CG Docket No. 17-59, WC Docket No. 17-97, at 4 n.8 (rec. Aug. 23, 2019); T-Mobile Comments, WC Docket Nos. 17-97 and 20-67, at 4 (rec. May 15, 2020); TNS July 24, 2019 Comments at 15 (“Indeed, the full benefits of SHAKEN/STIR cannot be achieved until it is nearly ubiquitously deployed.”).

¹¹² *See, e.g.*, AT&T Comments at 5-6; USTelecom Reply at 3-4 (arguing that “[t]he work is ongoing” to deploy STIR/SHAKEN, and that “it is premature to make any conclusions about the efficacy of any frameworks” in this Report); *see also, e.g.*, TNS July 24, 2019 Comments at 6.

¹¹³ AT&T Comments at 5.

¹¹⁴ *See, e.g.*, T-Mobile Comments, WC Docket Nos. 17-97 and 20-67, at 4 (rec. May 15, 2020); TNS July 24, 2019 Comments at 19 (supporting the Commission’s efforts to promote STIR/SHAKEN); Inteliquent, Inc. Reply at 1 (STIR/SHAKEN “is poised to greatly reduce robocalls and other harmful and fraudulent calls throughout the country.”); Call Authentication Trust Anchor Working Grp., North American Numbering Council, Report on Selection of Governance Authority and Timely Deployment of SHAKEN/STIR at 15 (2018), <https://docs.fcc.gov/public/attachments/DOC-350542A1.pdf> (“SHAKEN/STIR and specifically the SHAKEN SIP Framework are a key component of the overall system to both protect consumers against illegal robocalls by carrying the cryptographic signatures and providing secure information for reliably and efficiently tracing back identified illegal calls to the communications service providers that can identify the origin”); *id.* at 18 (“Implementation of the SHAKEN/STIR framework is an efficient and prudent way to ensure the security and protection of the telephone ecosystem.”).

¹¹⁵ *See, e.g.*, T-Mobile *Ex Parte* at 2 (“Using STIR/SHAKEN and its other scam-identifying tools, T-Mobile has identified over 21 billion scam calls and blocked over five billion calls to date.”); Press Release, Verizon, Verizon Continues to Lead Industry in Fight Against Robocalls (Dec. 3, 2020), <https://stockhouse.com/news/press-releases/2020/12/03/verizon-continues-to-lead-industry-in-fight-against-robocalls> (“STIR/SHAKEN . . . helps us make better decisions about what calls should be avoided.”); Press Release, AT&T, AT&T, Comcast Announce Anti-Robocalling Fraud Milestone Believed to Be Nation’s First (Mar. 20, 2019).

¹¹⁶ *See, e.g.*, TNS July 24, 2019 Comments at 7-8; Neustar, Inc. Reply, CG Docket No. 17-59, WC Docket No. 17-97, at 3 (rec. Aug. 23, 2019) (“[P]roviders will obtain better results if they include STIR/SHAKEN in the analytics that they deploy to combat illegal robocalls.”).

¹¹⁷ *First Report and Order and Further Notice*, 35 FCC Rcd at 3252, para. 25.

working in tandem, the Commission adopted a safe harbor enabling voice service providers to block unwanted calls by default if based on reasonable analytics that incorporate caller ID authentication information, so long as consumers are given the opportunity to opt out.¹¹⁸ Lumen supports “additional measures to supplement STIR/SHAKEN given the complexity of the larger illegal robocall problem,” noting that a “multi-faceted approach is likely to be more effective than STIR/SHAKEN alone.”¹¹⁹ Voice service providers are already incorporating STIR/SHAKEN authentication information into their call analytics engines to help make more informed call blocking decisions and better protect consumers from illegal calls.¹²⁰

As for assessing the efficacy of a non-IP caller ID authentication framework, the Commission recently determined that no solution is “effective” because industry has not yet standardized such a framework.¹²¹ As the Commission stated, we will continue to monitor industry progress toward a solution, and we look forward to progress as voice service providers fulfill their obligation to work to develop a non-IP caller ID authentication solution.¹²²

Specific Issues Identified in the Record. Despite overwhelming evidence from across the industry that STIR/SHAKEN is efficiently designed and thus far working as intended, some commenters have identified specific issues that they believe could impact the efficacy of STIR/SHAKEN. Specifically, they identify issues regarding enterprise callers, the Governance Authority’s policies, a lack of universal IP interconnection between voice service providers, and accessibility of voice service provider contact information. Industry is already making progress on many of these issues.

INCOMPAS raises the issue that certain complex enterprise use cases and business models could pose challenges in the STIR/SHAKEN framework, as it would be difficult for an outbound call to the highest level of attestation.¹²³ INCOMPAS champions “certificate delegation” as a solution to this issue, and requests that we encourage its development and adoption.¹²⁴ ATIS and the SIP Form recently approved a joint standard on certificate delegation, which gives guidance to voice service providers that wish to provide this service to their clients,¹²⁵ and stakeholders continue to explore alternative possible solutions for enterprise calling cases.¹²⁶ These developments demonstrate that industry is making progress to address INCOMPAS’s concern.

INCOMPAS and Inteliquent argue that voice service providers without access to numbers are unable to participate in STIR/SHAKEN because of the Governance Authority’s SPC token access

¹¹⁸ *Advanced Methods to Target and Eliminate Unlawful Robocalls et al.*, CG Docket No. 17-59, Third Report and Order et al., 35 FCC Rcd 7614, 7625, para. 25 (2020).

¹¹⁹ Lumen Comments at 3-4.

¹²⁰ See, e.g., AT&T *Ex Parte* at 2; Charter Comments, CG Docket No. 17-59, WC Docket No. 17-97, at 3 (rec. Jan. 28, 2020); Verizon Comments, CG Docket No. 17-59, WC Docket No. 17-97, at 4 (rec. Jan. 29, 2020).

¹²¹ See *Second Report and Order* at 36, para. 68 n.269.

¹²² See *id.* at 13, para. 24.

¹²³ See INCOMPAS Comments at 3; *Second Report and Order* at 29-30, para. 58.

¹²⁴ INCOMPAS Comments at 3.

¹²⁵ ATIS Comments at 2; see also ATIS., Signature-based Handling of Asserted Information Using toKENs (SHAKEN): Delegate Certificates (June 30, 2020), https://access.atis.org/apps/group_public/download.php/56801/ATIS-1000092.zip (ATIS-1000092).

¹²⁶ See SIPNOC, STIR/SHAKEN Virtual Summit, Deployment of Enterprise Attestation Uplift with a TN Registry (June 24, 2020), <https://www.sipforum.org/download/8-deployment-of-enterprise-attestation-uplift/?wpdm=3885&refresh=5fd1691a4675e1607559450>.

policy.¹²⁷ The Governance Authority recently revised its policy, effective upon the Commission’s Robocall Mitigation Certification filing deadline,¹²⁸ eliminating the requirement that a voice service provider have direct access to numbering resources to be cleared by the Policy Administrator for access to certificates.¹²⁹ Eliminating this requirement should significantly expand voice service providers’ access to STIR/SHAKEN. We will continue to monitor this issue to ensure that it does not stand in the way of effective caller ID authentication.

NTCA argues that a lack of IP interconnection between some voice service providers is a barrier to effective caller ID authentication.¹³⁰ Because STIR/SHAKEN is an IP solution, if a call goes over a non-IP interconnection point the caller ID authentication information is lost—even if both the originating and terminating voice service providers have IP networks.¹³¹ The Commission is aware of this issue,¹³² and explained in the *Second Report and Order* that it is monitoring it closely.¹³³ Industry stakeholders are also continuing to discuss and evaluate how to resolve this issue.¹³⁴ Further, as the Commission has found, even in instances where a voice service provider is unable to interconnect in IP, STIR/SHAKEN offers benefits for intra-network traffic.¹³⁵

Inteliquent asserts that voice service providers face challenges that hinder inter-network testing of STIR/SHAKEN with interconnecting partners for which they cannot obtain contact information.¹³⁶ As this is the first time that this issue has been brought to our attention, the Bureau will monitor the issue in case more voice service providers encounter similar difficulties, and will revisit the issue if it presents a serious roadblock to STIR/SHAKEN implementation. We encourage voice service providers that experience this or any other serious roadblock to implementation to call the issue to our attention. At the same time, because the TRACED Act and the Commission’s rules thereunder require voice service providers to implement STIR/SHAKEN by June 30, we encourage voice service providers to take the steps necessary to work diligently toward implementation, such as sharing contact information with other voice service providers.

¹²⁷ See Inteliquent Reply at 2 (“Pursuant to policy decisions made by STI-GA to implement the authentication framework, without direct access to numbers, a voice provider cannot register as a Service Provider. And without such a registration, these voice providers are unable to sign calls. This lack of ability to sign calls creates two problems that inhibit the framework. . . . [T]his undermines the efficacy of the STIR/SHAKEN framework . . .”).

¹²⁸ The Commission directed the Bureau to issue a Public Notice announcing both when voice service providers may begin filing certifications in the Robocall Mitigation Database and establishing the deadline for filed certifications. *Second Caller ID Authentication Report and Order* at 44-45, para. 83. The Commission further directed the Bureau to set the filing deadline no earlier than June 30, 2021. *Id.*

¹²⁹ See Secure Telephone Identity Governance Auth., *STI-GA Policy Decisions Document* (Nov. 18, 2020), <https://sti-ga.atis.org/wp-content/uploads/sites/14/2020/11/201118-STIGA-Board-Policy.pdf>; *STIR/SHAKEN Caller ID Authentication Governance Framework Revised to Expand Participation*, WC Docket No. 17-97, Public Notice (WCB Nov. 18, 2020), <https://docs.fcc.gov/public/attachments/DA-20-1374A1.pdf>.

¹³⁰ See NTCA Comments at 3-4.

¹³¹ See *Second Report and Order* at 32, para. 61 n.241.

¹³² See *Parties Asked to Refresh the Record on Intercarrier Compensation Reform Related to the Network Edge, Tandem Switching and Transport, and Transit*, CC Docket No. 01-92, WC Docket No. 10-90, Public Notice, 32 FCC Rcd 6856 (WCB 2017) (*Network Edge Public Notice*).

¹³³ *Second Report and Order* at 33, para. 63 n.249; see also *Network Edge Public Notice*.

¹³⁴ See SIP Forum, *The Holy Grail: Achieving Ubiquitous IP Interconnection and the Battle over Inter-Carrier Compensation*, <https://register.gotowebinar.com/register/3088351551805713677> (last visited Dec. 22, 2020) (video recording of panel of industry experts discussing the issue of achieving ubiquitous IP interconnection).

¹³⁵ *Second Report and Order* at 32-33, para. 63.

¹³⁶ See Inteliquent Reply at 2.