



**ATIS-100096**

ATIS Standard on -

**Signature-based Handling of Asserted information using toKENs  
(SIP KEN):**

**Out-of-Band PASSport Transmission Involving TDM Networks**



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**Signature-Based Handling of Asserted information Using  
Tokens (SHAKEN):  
Out-of-Band SAsSPort Transmission Involving TDM  
Networks**

**Alliance for Telecommunications Industry Solutions**

Approved July 15, 2021

**Abstract**

The Signature-based Handling of Asserted information using toKENs (SHAKEN) framework enables an authorized Voice over Internet Protocol (VoIP) service provider to deliver a cryptographically protected assertion that the calling user is authorized to use the calling telephone number to a called user via Session Initiation Protocol (SIP) signaling that the calling user is authorized to use the calling telephone number. This specification extends the SHAKEN framework to enable service providers using Time Division Multiplexing (TDM) signaling to participate in the SHAKEN ecosystem without placing any new requirements on authorized SHAKEN service providers.

## Foreword

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The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Packet Technologies and Systems Committee (PTSC) develops and recommends standards and technical reports related to services, architectures, and signaling, in addition to related subjects under consideration in other North American and international standards bodies. PTSC coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to U.S. International Telecommunication Union Telecommunication Sector (ITU-T) and U.S. ITU Radiocommunication Sector (ITU-R) Study Groups or other standards organizations, and reviews for acceptability or per contra the position of other countries in related standards development and takes or recommends appropriate actions.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, 1200 G Street, NW, Suite 500, Washington, DC 20005.

The **Non-IP Call Authentication Task Force** under the **ATIS Packet Technologies and Systems Committee (PTSC)** was responsible for the development of this document.

At the time it approved this standard, the PTSC had the following leadership:

M. Dolly, PTSC Chair

V. Shaikh, PTSC Vice Chair

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ATIS Standard on –

# Signature-based Handling of Asserted information using toKENS (SHAKEN):

## Out-of-Band PASSporT Transmission Involving TDM Networks

### 1 Scope, Purpose, & Application

#### 1.1 Scope

This specification extends the SHAKEN framework to enable the transmission of Personal ASSertion Tokens (PASSporTs), as defined in RFC 8224, *Personal Assertion Token*, for calls that use TDM signaling and/or TDM switches during transit. This specification adheres to the following core principles:

1. The solution does not place any new requirements on SHAKEN-compliant VoIP service providers.
2. Preferably, the solution supports the most common call scenarios representing a majority of traffic but does not need to support all possible call scenarios.
3. The solution supports and facilitates the long-term industry goal of migrating to VoIP-based networks.

Within the specification, cryptographically signed PASSporT(s) are exchanged out-of-band, that is, separate from the telephone network signaling. The mechanism of exchanging PASSporT(s) out-of-band is based on draft-ietf-stir-servprovider-oob-01, *Out-of-Band STIR for Service Providers*.

It is recommended that ATIS-1000097, *Technical Report on Alternatives for Caller Authentication for Non-IP Traffic*, evaluating the viability of implementing this call authentication mechanism for TDM networks, be considered along with this document.

#### 1.2 Purpose & Application

The SHAKEN framework provides a set of tools that enable verification of the calling party's legitimate right to use a calling telephone number for a call. The SHAKEN protocol specification ATIS-100007 and 10002, *ATIS Standard on Signature-based Handling of Asserted information using toKENS (SHAKEN)*, describes an authentication mechanism that can be invoked by the Originating Service Provider (OSP) to authenticate itself at a transit switch as the service provider responsible for the call origination and to "attest" to the legitimacy of the calling telephone number associated with a call. A cryptographic signature across the call parameters protects the integrity of the SIP parameters and the OSP's call markings. In the SHAKEN framework, the OSP's Secure Telephone Identity Authentication Service (STI-AS) creates a PASSporT and inserts this PASSporT in a SIP Identity header per RFC 8224, *Authenticated Identity Management in the Session Initiation Protocol*. The SIP INVITE is then routed over the network-to-network interface (NNI) through the standard inter-domain routing configuration.

TDM switching elements, in today's public switched telephone networks, do not support the Identity header necessary to interwork with SIP. Thus, the Identity header may fail to arrive at the Terminating Service Provider (TSP) network's transit switch for verification by their Secure Telephone Identity Verification Service (STI-VS) because the call may not be transmitted using SIP signaling end to end. *Out-of-Band PASSporT Transmission Involving TDM Networks* may remedy this problem by enabling service providers to exchange PASSporT(s) through a Secure Telephone Identity Call Placement Service (STI-CPS). However, this is predicated on certain TDM interworking functions as identified later in this document. SHAKEN authentication, verification, and Public Key Infrastructure (PKI) operation remains the same.