**Committee Name:** ATIS IP-NNI

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**TITLE: Origination and Destination formatted to E.164**

**SOURCE:** TNS

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**ABSTRACT:**

With the June 30, 2021 FCC Mandate in effect requiring large service providers with more than 100, 000 subscribers to implement STIR/SHAKEN on their IP network, TNS has observed that approximately 10% of the signed calls had verification failures (verstat equaled “No-TN-Validation”). Approximately 95% of these failures were the result of the destination number or origination number in the PASSporT payload not matching what was received in the verification request claim.

**Current Behavior:**

In the failure cases, the telephone number (origination or destination number) in the PASSporT payload was in a non E.164 format and the telephone number used in the verification claim was of E.164 format. This could have been of result of the destination number being modified somewhere along the call path or the telephone number in the payload didn’t match either the PAI or From headers of the SIP INVITE. To reduce the number of verification failures, TNS is recommending that the telephone numbers used as the destination number and origination number be in E.164 format for both signing the call and for the SIP INVITE headers, “To”, “PAI”, and “From”. This would reduce the number of verification failures.

The proposed changes are in section 5.2.1 and 5.2.2 and are diffmarked.

## Authentication procedures

### Destination URI handling for SHAKEN authentication

In call scenarios where the originating SP is required to replace a non-routable dial string[[1]](#footnote-1) in the Request-URI with an E.164 number in order to route the call, the originating SP shall also update the To header field to contain the same E.164 number. The To header field shall be updated before SHAKEN authentication services are applied to the originating call. This will ensure that the To header TN is of the form required to support SHAKEN verification; i.e., it will enable remote verifiers to unambiguously canonicalize the To header TN during PASSporT signature validation, and to positively confirm that the To header TN identifies the intended recipient of the call as part of replay attack detection.

NOTE: Due to the unique routing requirements for emergency calls, the above procedure does not apply to emergency originations (i.e., where the To header field contains digits “911” or a service URN in the “sos” family). Also, the procedures for handling the conversion of a toll-free number to a routing number are specified in Clause 5.2.1, ATIS-1000085.v002, *ATIS Standard on Signature-based Handling of Asserted information using toKENs (SHAKEN): SHAKEN Support “div” PASSporT*, and ATIS-1000093, *ATIS Standard on Toll-Free Numbers in the SHAKEN Framework*.

As a call traverses thru the voice network, it is possible that the format of the destination number in the To header gets modified. Consequently, the validation can fail since the destination number in the verification claim request does not match the destination number in the PASSporT payload. To help reduce the number of verification failures at the terminating service provider’s network, it is recommended that the telephone number in the To header be of E.164 format and is used as the destination number in the SHAKEN authentication service when applied to the originating call.

### Origination URI handling for Shaken authentication

It is also possible that the verification of the call fails if the origination number in the payload does not match the origination number in the verification request. To reduce the number of origination number mismatch by the STI-VS, it is recommended that the telephone number in the PAI and/or From header be of E.164 format and is used as the origination number in the SHAKEN authentication service when applied to the originating call. This will ensure the origination number in the PASSporT payload matches the origination number in the verification request.

### PASSporT & Identity Header Construction

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1. Examples of non-routable dial strings include speed-dial codes, vertical service codes, NXX service codes, abbreviated extension numbers in a private dial plan, local numbers in a 7-digit dial plan (missing the NPA and country-code digits), non-toll-free 10-digit numbers (missing the country-code digit), dial-around digits (101xxxx), international dialing prefix (011+), and domestic or international operator codes (0-, 0+, 010-, 01+). [↑](#footnote-ref-1)