**ATIS/SIP Forum IP NNI Task Force**

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**Contribution**

**TITLE: Display of Verified Caller ID**

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**Abstract**

This contribution introduces text in multiple sections of the *“Technical Report on a Framework for Display of Verified Caller ID”* [IPNNI-2017-00019R4] including scope, definitions, privacy assumptions, display options, preliminary usability studies, and recommendations drawn from those preliminary studies.

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ATIS Standard on

**ATIS Technical Report on a Framework for Display of Verified Caller ID**

**Alliance for Telecommunications Industry Solutions**

Approved Month DD, YYYY

**Foreword**

The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The [**COMMITTEE NAME**] Committee [**INSERT MISSION**]. [**INSERT SCOPE**].

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 a 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, [**COMMITTEE NAME**], 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, [**COMMITTEE NAME**], which was responsible for its development, had the following leadership:

[**LEADERSHIP LIST**]

The **[SUBCOMMITTEE NAME]** Subcommittee was responsible for the development of this document.

**Revision History**

| **Date** | **Version** | **Description** | **Author** |
| --- | --- | --- | --- |
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# Scope, Purpose, & Application

## Scope

This technical report provides a framework for signaling verified Caller ID information from the network to a User Equipment (UE), and displaying the information on the UE in a uniform manner, independent of technology. The main goal is to produce display guidelines that help empower consumer in managing their calls, as per the Robocalling Strike Force recommendations.

This report should be treated as a living document as the guidelines are expected to evolve. The deployment of verification methods, such as STIR/SHAKEN, and application of call analytics are expected to occur in stages over an extended period of time. Hence, the operations experience gained over time is expected to provide feedback and input to future issues of this report.

Results of applicable usability studies are expected to contribute to the evolution of the recommendations in this report, as they become available.

More research will be needed to identify the types of displays that empower end users with messages that are easy to interpret. At this time, such research is outside the scope of this report.

Editor’s Note: Need clarification on scope. Interested parties to bring in proposal via contribution to modify scope and title of the document.

## Purpose

The guidelines presented in this document are best practices based on a review of industry standards and studies on the effectiveness of warning signs and human factors related to the reading and comprehension of variable messages (text and symbolic). These guidelines help meet the goals of regulators and consumer protection agencies for empowering consumers with simple and effective call information.

This report recommends that these guidelines be taken into consideration by all stakeholders (service providers, equipment manufacturers and analytics providers) in the deployment of verified Caller ID displays and the composition of its related messages.

Variations may exist, subject to local policy.

## Application

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# Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

# Definitions, Acronyms, & Abbreviations

For a list of common communications terms and definitions, please visit the *ATIS Telecom Glossary*, which is located at < <http://www.atis.org/glossary> >.

## Definitions

**Caller identity:** The originating phone number included in call signalling used to identify the caller for call screening purposes. In some cases this may be the Calling Line Identification or Public User Identity. For the purposes of this study, the caller identity may be set to an identity other than the caller’s Calling Line Identification or Public User Identity.

**End user/consumer**: used interchangeably to refer to a customer of telecommunications service that is not a carrier or a device, and for whom the service was ultimately created or intended.

**Normal call profile:** The display of all identity information/services the end user subscribes to, outside the mitigation services that include analytics.

## Acronyms & Abbreviations

|  |  |
| --- | --- |
| ATIS | Alliance for Telecommunications Industry Solutions |

# Architecture

Editor’s note: add figure illustrating various access technologies and a variety of device types (UEs).

# Signaling of Verified Caller ID

## Signaling of Verified Caller ID using Conventional Caller Name (CNAM)

Editor’s Note: Items that need further consideration are trust in the source of the Caller ID data, security considerations, limitations on the 15 characters, impacts on current infrastructure, and consumer education.

## Pros and Cons of Signaling Special Indicators in Conventional Caller Name (CNAM) Display

# Display Guidelines for All IP Networks and Devices

With the implementation of STIR/SHAKEN and certificate governance models, specific data will be signaled between networks which could help assess the risk associated with each call.

It is important to realize that this information signaled between networks (such as attestation levels and certification information) is **not meaningful or suitable to be displayed to the end user**. However, when further analytics are applied to that information, a more useful "communication" can be formulated and presented to the end user.

The factors contributing to the final display and the possible display options are the subject of the present document.

The guidelines in the present section are provided for screen-based devices, such as smartphones, operating an all-IP network. Considerations for other scenarios of analog devices served by IP networks, or by circuit-switched networks will be discussed in Section 7.

## Entities that shape the display

Multiple entities contribute to the ultimate message delivered to the user about the trust level of incoming calls.

Each entity may be responsible for specific data that is signaled, processed, or displayed at different points in the call setup.

Editor's Note: This section proposes the following entities as the key contributors to the ultimate display and the role each one plays. Other entities may be added in the future, if deemed necessary.

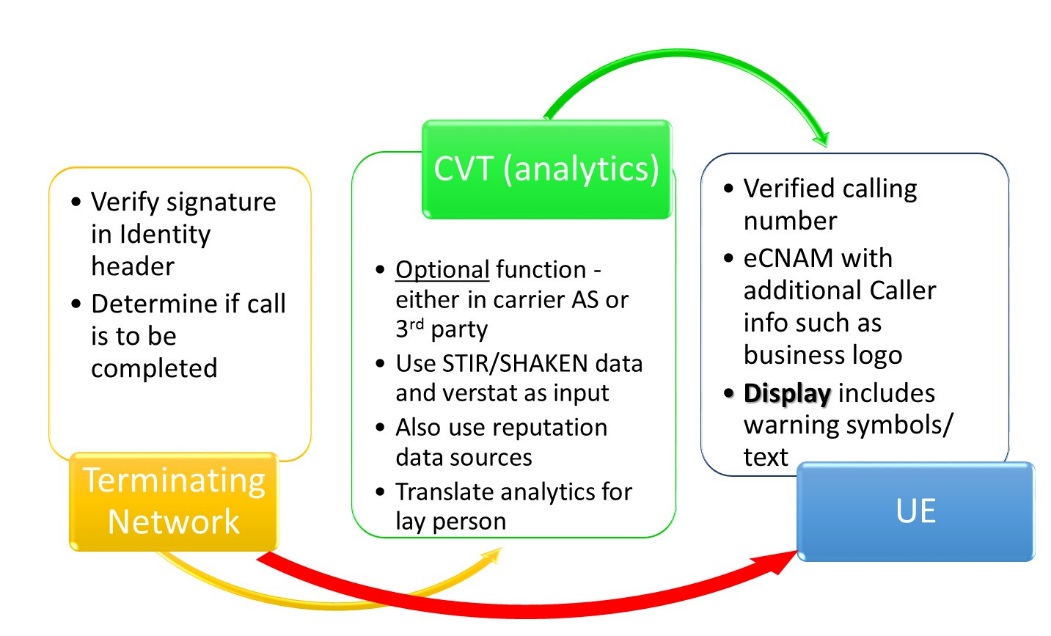


Figure 2. Entities Contributing to Ultimate Display

### IP Network

The originating network is responsible for signaling the Identity header containing the pertinent claims and attestations about the calling number, per draft-ietf-stir-rfc4474bis and ATIS-1000074.

The terminating network is responsible for verifying the received claims. Results of the verification are inserted by the AS in the "verstat" tel URI parameter (defined in 3GPP TS 24.229) to provide the UE with the calling identity number verification status in an initial INVITE request.

### Call Validation Treatment (CVT) or Analytics

CVT is a function that analyzes data to ascertain the level of risk associated with the incoming call. CVT may be implemented as part of the terminating network (e.g., in an AS) or by a third-party that partners with the service provider, or in association with a UE application. CVT applies different algorithms to data it obtains on the TN in question. CVTs typically access a multitude of data sources on each TN to improve the accuracy of its results.

### User Equipment (UE)

This section assumes a wireless handset with a screen display that is compliant with Verstat requirements in 3GPP standards.

## Assumptions

1. The guidelines herein are limited in scope to empowering end users in managing their identity services, and not business verification services.
2. Network data and/or analytics may not be available/implemented always in all networks.
3. When an end user subscribes to an analytics service, the end user understands that the assessment is predicated on the statistical evaluation of data available on the current call along with data on other similar calls. Consequently, he/she may receive false positive and false negative messages on some of their incoming calls.
4. It is expected that some service providers will delegate the delivery of the final call information display (including TN, calling name, and the results of verification) to the analytics provider. For those cases, the analytics provider is expected to adhere to the application of privacy rules for the calling number and name portions of the display; i.e., an "Anonymous" message would be displayed for name and TN.
   1. The terms of agreement between the service provider and the analytics provider are expected to require preservation of the caller's privacy.
   2. Further clarification and/or safe harbors are needed to determine whether the name and TN could be anonymized while additional call information, such as call category and potential fraud risk, could be delivered to help empower the end user.
5. In the absence of clarification or any special allowances on handling private calls, the guidelines herein call for anonymizing ALL call information if the received calling number is anonymous.
6. The end user may subscribe to multiple mitigation services. Order and preference of display may be determined by the service provider. Variations in operating systems and the plethora of available applications make it impractical to set interoperability or prioritization guidelines. Therefore, it is the responsibility of end users to select the mitigation service that best meets their needs.

## Available Call-related Information

The data outputs from the network and CVT will be at the center of the message delivered to the user (e.g., warning or other). reliable



Therefore, it is recommended that attestation levels and identifiers from SHAKEN be made available to the CVT function, according to local policies.

## Preliminary Display Usability and Comprehension Studies by Hiya

Over the course of Q2 and Q3 2017, Hiya Inc. conducted several usability studies targeted at the display guidelines of the STIR/SHAKEN protocol. The goals of the study were twofold:

1. To measure the potential impact of a positive assurance indication for verified calls (the “green checkmark”), and
2. To assess various textual and iconographic display options for caution indicators on suspicious calls.

Hiya conducted three independent brief usability studies on different audiences:

1. A user comprehension and influence study on robust caller profiles and certified call markers;
2. A user impact analysis of various phrasings and iconography for suspicious call messaging; and.
3. A call pickup rate impact analysis of a “certified” checkmark icon against existing Hiya users.

### Study #1: Comprehension and Impact of Certified Call Markers

#### STUDY DESCRIPTION:

Hiya interviewed 11 randomly chosen individuals among a pool of volunteers to participate in a paper-based usability study.

Participants were offered no context or explanation of STIR/SHAKEN, or the purpose of the study.

Participants were presented with a sequence of incoming call UI mockups (see Exhibit A), and asked a series of questions:

* What do you notice about this screen?
* What confidence or trust do you have in this caller?
* What effect does this have on your opinion of previous screens (if any)?

The mockups were designed to enhance the incoming call experience with expanded caller profile information, with the final mockup showing a “certified call” confirmation reflective of STIR/SHAKEN validation.

Interviews lasted an average of 35 minutes per participant.

#### RESULTS:

In nearly all cases (10/11), participants showed a “strong” or “very strong” indication that additional caller profile information strengthened their confidence in the legitimacy of the theoretical phone call.

This applied across all mockups, prior to “certified call” marker.

For the “certified call” mark,

* A significant number of participants (8/11) identified the mark as reassurance to the legitimacy of the call, and all who identified this also expressed future doubts to the legitimacy of any future call lacking the indication.
* Some (6/11) expressly stated that they would become less likely to answer any unknown call lacking certification, once the certification marker was seen.

#### CONCLUSIONS:

Hiya has concluded that the use of such a marker with clear context would negatively impact all calls lacking this marker.

It remained unclear from the study if the marker would have a positive impact on pickup rates for marked numbers. (Hiya has previously demonstrated that extended call profile information positively influences call pickup rates, without any “certified call” indication.)

### Study #2: Warning Phrasing and Iconography Test

#### STUDY DESCRIPTION

Hiya has crafted 3 near-identical mockups of an incoming call screen. The only delta between the screen was the presence of a warning phrase and/or icon, expressing reasonable doubt about the legitimacy of the caller. Study participants were then asked a series of questions:

* Would you answer this call?
* Was this call from a trustworthy source?
* Would you block this number from calling in the future?
* Why do you think you’re receiving this call?

In phase one of the study, no icons or colorations were used, only phrases. The following phrases were used:

* “Spoofed Phone Number”,
* “Suspicious Call”, and
* “Faked Phone Number”.

#### RESULTS

*In progress*.

#### CONCLUSIONS

*In progress*.

### Study #3: Call Pickup Rate Test

#### STUDY DESCRIPTION

Hiya selected 70 high-volume (in excess of 600 monthly observed calls) legitimate business phone numbers from Canada with varying pre-existing caller profile information. Canadian numbers were chosen because of Hiya’s strong adoption rate of the Samsung “Smart Call” caller ID service.

Call creation rates and user pickup rates were monitored for these numbers over a two-week period, during which Hiya caused the display of a simple white checkmark to be shown for any Smart Call user.

After two weeks, the checkmark was removed and call volume and pickup rates were measured for an additional two weeks.

#### RESULTS

It is important to note that Hiya could not identify or control the individuals receiving phone calls from the selected businesses. Therefore, it is not possible to confirm the results of the initial study (that individual pickup rates would drop as users become familiar with expecting a checkmark on legitimate calls).

On average, Hiya observed a 4.89% increase in call pickup rates overall while the checkmark was present.

#### CONCLUSIONS

Further analysis is pending to determine if the number’s existing call profile (a “caller ID” name) or business industry was more effective than others.

But overall, this is taken to reinforce the positive impact a certified marker can potentially have on pickup rates for verified calls.

## Recommended Data Treatment and Display Options

1. In the absence of an analytics service, and subject to local policy, a warning (symbols and text) should be displayed to the user if verification fails, independent of the attestation level. Otherwise, for other values of verification, the user should receive a normal call profile based on the services they subscribe to.
2. STIR/SHAKEN and verification information should be made available to the CVT (analytics), when available.

Table X+1: Summary of Proposed Displays to the User

|  |  |  |  |
| --- | --- | --- | --- |
| Attestation (by the originating end) | Verification (by the terminating network) of the originator's signature/cert | Availability of Analytics | Message presented to the User |
| A - Full | Passed | Not Available | Normal call profile |
|  | Available | Display analytics results\* |
| Failed | Not Available | Warning\*\*[[1]](#footnote-2) |
|  | Available | Display analytics results\* |
| No Verification performed | Not Available | Normal call profile |
|  | Available | Display analytics results\* |
| B - Partial | Passed | Not Available | Normal call profile |
|  | Available | Display analytics results\* |
| Failed | Not Available | Warning\*\* |
|  | Available | Display analytics results\* |
| No Verification performed | Not Available | Normal call profile |
|  | Available | Display analytics results\* |
| C - Gateway | Passed | Not Available | Normal call profile |
|  | Available | Neutral display with analytics results |
| Failed | Not Available | Warning\*\* |
|  | Available | Display analytics results\* |
| No Verification performed | Not Available | Normal call profile |
|  | Available | Display analytics results\* |
| Not A, B or C. No Attestation performed (e.g., early stages when carrier hasn't implemented STIR/SHAKEN) | *Nothing to sign – is that a "Fail"* | Not Available | Normal call profile |
|  | Available | Display analytics results\* |

\* This assumes the STIR/SHAKEN data was provided as input to the analytics service. Analytics results include additional information on the caller, and may include a warning.

\*\* Some service providers may – based on consumer choice and consent - block these marked calls instead of completing them with a warning.

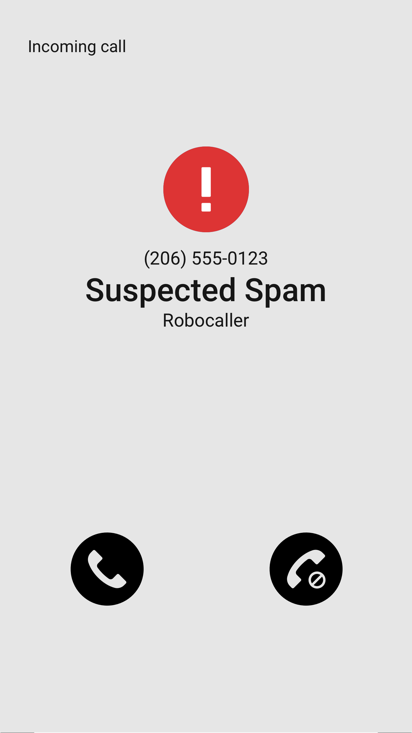
## Example Displays

These examples are provided for the illustration and enhancement of the scenarios listed in the above table.

### Full Attestation and Verification Passed (no analytics)

### In this scenario, the user does not subscribe to a CVT service. The delivery of the Verstat (TN validation passed) delivers the call to the UE without warnings (or affirmations). The logo and location (city and state) of the caller is retrieved and delivered by eCNAM. C:\Users\ehalmow\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\identified.pngGateway Attestation, Verification Passed, subscribes to analytics (analytics determine the call is suspicious)

In this scenario, the user subscribes to a CVT service that provides analytics. A gateway attestation is inconclusive to the caller, but an analytics service has flagged the caller as a known scammer. Therefore, a warning is provided to the user.

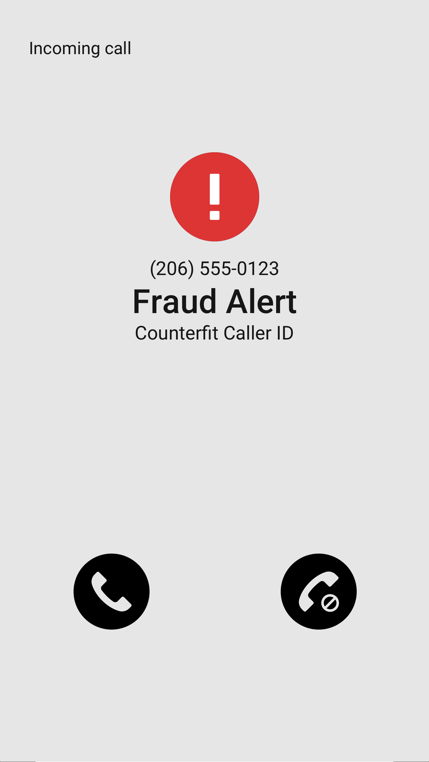


### Verification Failed

If the verification failed, CVT may not be necessary or be used. There are several possible outcomes.

The service provider may simply block the call from terminating to the end user, per the end user's request.

Alternatively, a warning would be provided along with an explanation of the reason behind the warning. The end user is then forewarned and empowered to manage incoming calls based on all the information made available. A CVT service may be able to provide more useful reasoning, but is not expected to.



### Basic recommendations on the Display or Message delivery to the UE

Editor's Note: Revise this section as more details become available from usability studies.

As a result of the above studies, it is recommended that [ the following are examples of recommendations for further discussion]:

1. eCNAM delivers the aggregate of all the information available about the TN (caller identity, results of CVT analytics, and information queried by the terminating provider)
2. The use of multiple symbols in a given display is not recommended because the consumer's interpretation of different symbols may result in confusion and detract from the value the service is providing.
3. Displaying status symbols, such as checkmarks, on calls with "full attestation – verification passed", is not recommended (studies show it leads to consumer confusion).
4. It is recommended that only warning symbols be provided when warranted.
5. For displays where a warning symbol should be displayed, the following are suggested symbols to choose from:
   1. 
   2. 
6. Audible special ringing/tones may be applied on calls that fail verification as an consumer option.
7. Minimize length of verbal messages to a choice of tested, effective phrases (the following are examples for further discussion):
   1. Caution: possible scam
   2. Fraud Alert
   3. Possible Scam
   4. Warning: do not give personal information
   5. *More from human factors experts*

## ADA Considerations

* 8% of the male population are color-blind. Therefore, the display should not rely heavily on red and green to convey results.
* Ensure messages are clearly understood without relying on colors (e.g., via text or sound)
* Consider audio announcements for the visually impaired before the call is completed (within the limits of post-dial delays)

# Display Guidelines for Analog Devices

## Analog Devices connected to an IP Network

Limited Screen display

Are these devices capable of handling

a) PASSport's attestation levels

b) results of verification (Verstat), and

c) displaying analytics results?

## Analog Devices connected to Circuit Switched (CS) Network

Efforts at reducing spoofing are likely to increase end user trust in the caller identity information (name and number) and to help empower them in managing their calls. However, end users served by the CS network are less likely to benefit from verification and CVT.

Effective solutions for this segment of users are better delivered in consumer devices.

It is recommended that devices allow one or more of the following:

* Storage and management of high volume black and white lists (10,000+ entries)
* End users to manage the lists via simple "button" presses to add/delete numbers from the list
* A mechanism that screens and reduces robocalls by requiring callers to proactively press a digit through an interactive request to prove the caller is not a robot.
* Optional updates from more diverse reputation sources (e.g., FTC and FCC lists). This could be downloaded periodically to the device based on end user's subscription.

For this population of users, the available – albeit limited - display should be used to maximize the caller information delivered/displayed. In addition to the calling number, the end user is encouraged to subscribe to a Name Delivery service.

# Related SDOs and Fora

## 3GPP

## GSMA

## Cable Labs

## Consumer Electronics

# Conclusions

**Annex A**

(normative/informative)

# A Illustrative Examples

This annex will document supportive material





1. Delivery of a warning indicator upon verification failure is subject to local policy. [↑](#footnote-ref-2)