

# Simulated User Testing of E-Cigarette Age Gating Technology

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## Abstract

There is an epidemic of youth use of tobacco products. As a result, Congress increased the legal smoking age to 21 in the United States. Unfortunately increasing the smoking age does not prohibit youth from getting access to tobacco products. They can still use fake ID's or have friends or family purchase them. A Smartphone-based technology has been developed by Glas Inc, that prohibits youth from using the product. **The E-Cigarette is locked when purchased.** The user is required to register the device to activate it. The technology is cloud based and uses artificial intelligence to conclude that the user is above the legal smoking age and also that they are alive. The technology used to age verify is not based on a single data point such as claimed age but is a combined collection of information about the user from the internet as well as facial recognition software designed to establish the age of the user. The technology periodically communicates with the E-Cigarette through the Smartphone to assure that the user is the registered user. The device shuts down if out of Bluetooth range of the Smartphone, prohibiting the device from being purchased by one person and given to another. Potential failure scenarios were developed to test the product functionality. Sixty subjects were provided with Smartphones loaded with non-branded age-gating software. In all scenarios tested, none of the 16-20 year-old individuals were able to validate that they were over the legal age of 21. This demonstrates that, under the conditions of this test, the age-gating functionality is effective in preventing under legal age activation and use of the product.

## The Product and Technology

The product is a pod based vaping system (PBVS). It is a rechargeable electronic nicotine delivery system (ENDS) device. **Figure 1** shows a picture of the Glas G2 product. The ENDS is enabled with technology designed to prevent underage use and also prevent re-use or use of counterfeit E-Liquid containing pods. The pods are available in tobacco, menthol, and non-descript flavors.

The technology used to age verify is not based on a single data point such as claimed age but is a combined collection of information about the user from the internet as well as facial recognition software designed to establish the age of the user. **Figure 2** is a schematic of how the age gated protected PBVS is intended to work with the smartphone application. The first step in the process is that the smartphone establishes that the user is over 21 years of age before the PBVS can be activated. Once legal age has been verified, a "certificate" is sent to the PBVS to allow it to be turned on and used. **During use, the PBVS re-activates as needed to assure that only the age verified consumer is using the system.** The PBVS cannot be purchased by one individual and used by another except in a short distance from the authorized smartphone. This **prevents an adult from purchasing the device and giving it to another individual who is not in close proximity to the authorized smartphone at all times.** Every flavor pod carries an imbedded certificate which prevents counterfeiting and reuse. **Figure 3** shows some of the smartphone connectivity features.

Figure 1. Glas G2 Device and Pod

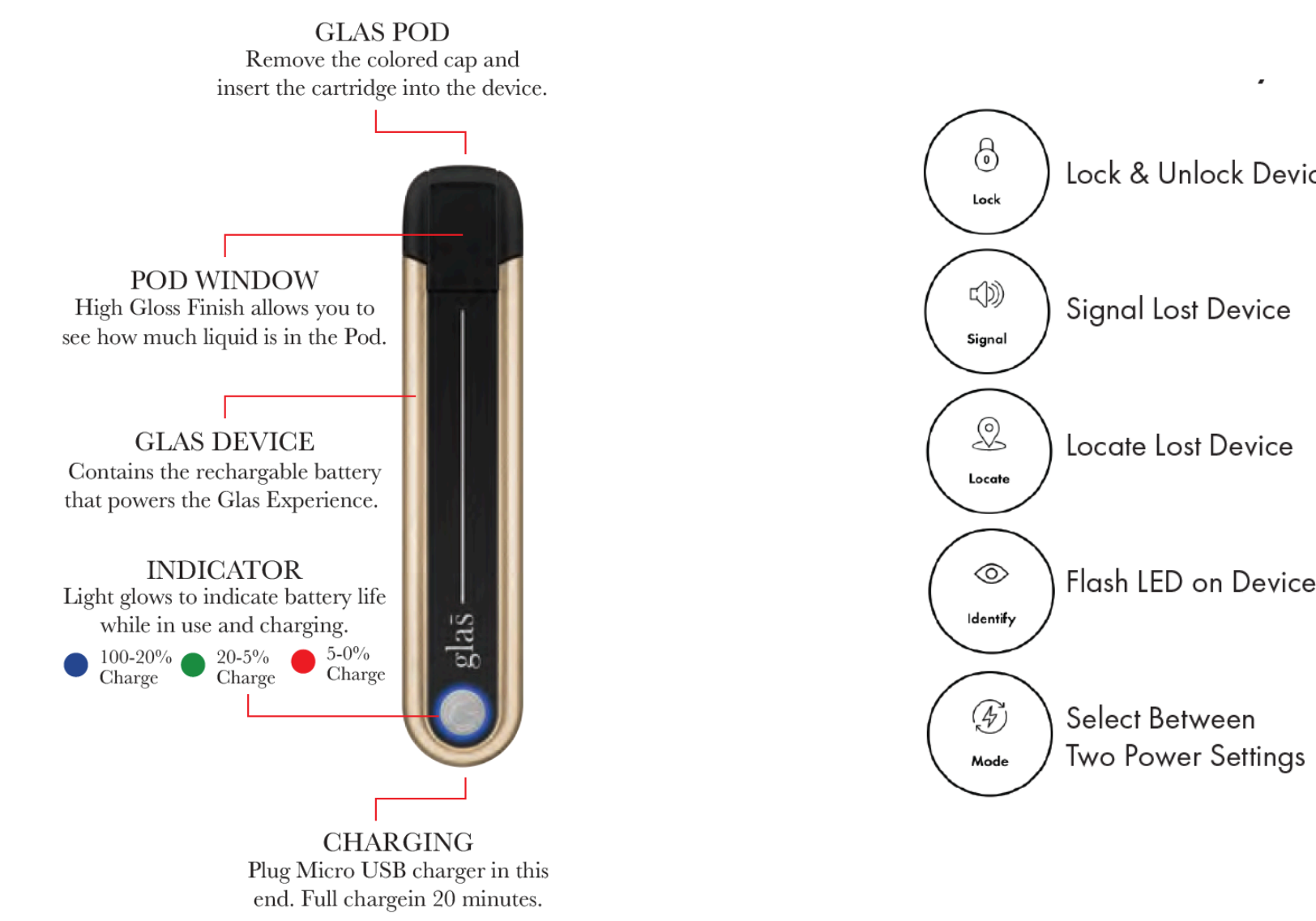


Figure 3. Smartphone Connectivity Features

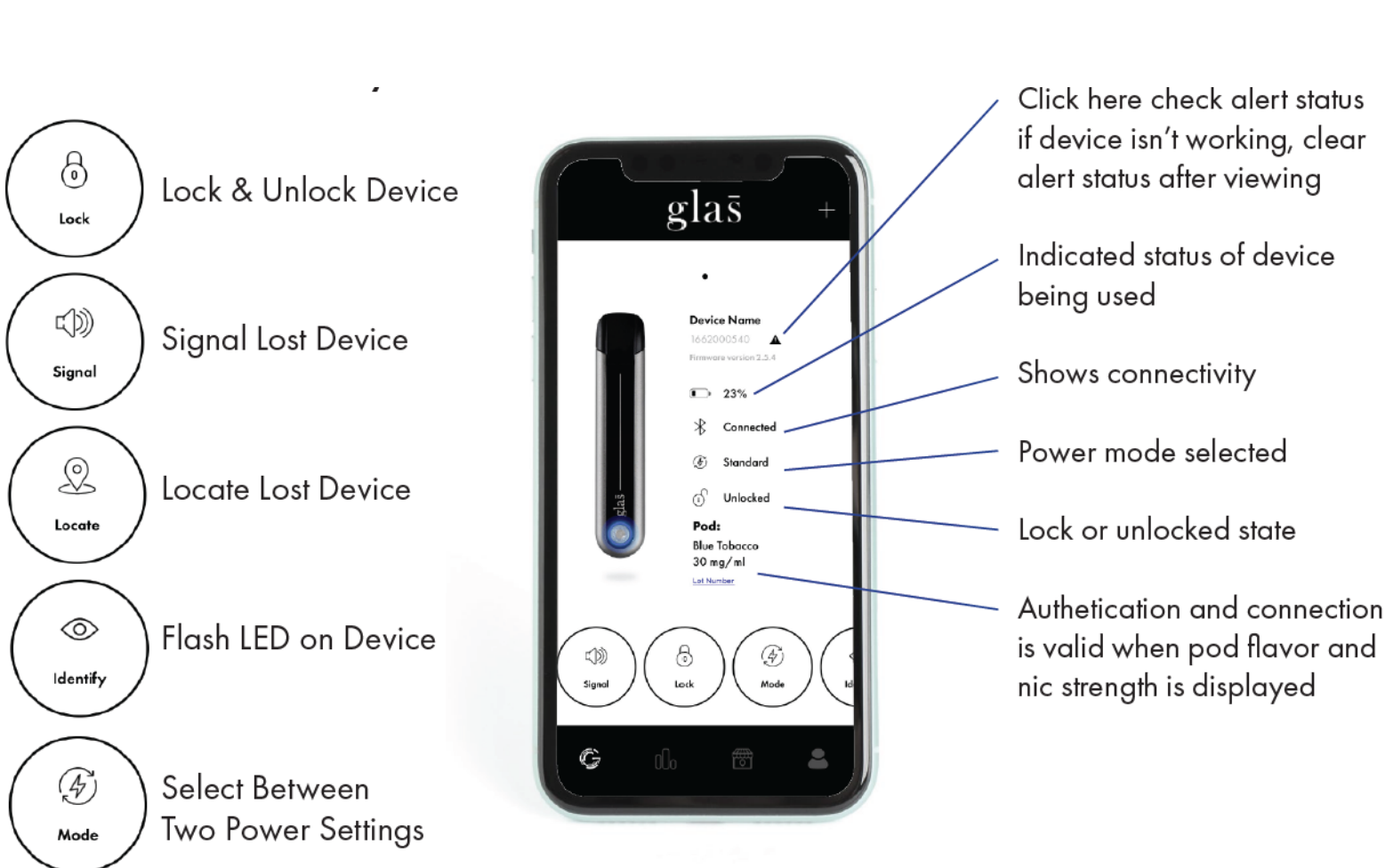


Figure 2. Age-Gating General Application Schematic



## Methods

Sixty subjects were provided with Smartphones loaded with non-branded age-gating software. The subjects were not told what the software was to be used for and were not aware that it would be used on a vaping product. **Table 1** below shows the age groups and number of subjects included in the study. **The principal age group of interest was the under legal age (16 - 20)** with 36 subjects. This group was tested with 7 different scenarios to try to age verify and allow access to the product. The second group were legal aged subjects (21 - 24) who might have trouble age verifying because of their appearance or documentation. The third group aged 30 – 49 was included as a control for subjects who should normally be able to easily age verify.

Table 1. Age Groups and Number of Subjects in Each Group

Group Number	Age Group	Number of Subjects
I	16 – 20 years old	36
II	21 – 24 years old	18
III	30 – 49 years old	6

For the purposes of testing the Smartphone age-gating functionality, seven baseline scenarios were developed covering a variety of situations likely to be encountered while using the application:

- Use of a valid driver's license (DL) or government-issued ID (GID),
- Use of a DL or GID of a person of Legal Age (LA) and exiting out of the screen requesting a real-time photo or selfie,
- Use of a DL or GID of a person of LA and attempting to scan the photo on the ID in lieu of a selfie,
- Use of a DL or GID of a person of LA and replacing the photo on the ID with one of themselves (non-official ID),
- Use of a DL or GID of a person of LA and altering the information that is extracted from the databases with that of individual's own (i.e., date of birth, name, ID/DL number),
- Use of a DL or GID of a person of LA and replacing the photo on the ID with an aged photo of themselves (non-official ID),
- Having a person of LA age-verify and at the point of revalidation (approximately 2 minutes after the age-verification), which requires a selfie of the person on the ID/DL, instead take a selfie of the person under LA.

**Table 2** lists the seven different scenarios that were used in the test along with the procedures the subjects went through to try to defeat the application. The scenarios were designed to test for the ability of an underage individual to defeat the application. LA participants should be able to pass Scenarios 1, 2, and 7. **Table 2** shows the procedures used to test various foreseeable events leading to age verification. **Table 3** shows the scenarios that each age group tested.

Table 2. Hypothetical Scenarios and Procedures

	Foreseeable Sequence of Events	Procedure
Scenario 1	Minors (below the legal age) get access to the device without proper authentication.	Participants used their own valid ID (vertical for ages 16-20 in NC) to initiate the age-verification process.
Scenario 2	The participant is required to take a selfie that matches the photo on the ID, otherwise the participant will not age-verify.	Participants used a photo of the valid ID of the facilitator, who was over 21, to initiate the age-verification process. At screen 10, they were instructed to exit out of the age-gating application.
Scenario 3	Minors (below the legal age) provide a picture or a non-live video showing the picture of the owner of the DL/ID for the selfie.	Participants used a photo of the valid ID of the facilitator, who was over 21, to initiate the age-verification process. At screen 11, they were instructed to take a picture of the photo on the valid ID in lieu of their own selfie.
Scenario 4	Minors (below the legal age) provide to the App non-official DL/IDs that include the following: 1. their own photos on the non-official DL/IDs. 2. Name and DOB information that does not match an official DL/ID record.	Participants used a photo of the valid ID of the facilitator, where the facilitator's photo was replaced with the participants selfie, to initiate the age-verification process. At screen 11, they were instructed to take a selfie.
Scenario 5	Minors (below the legal age) use the edit option to alter the information extracted from the DL/ID to match a valid DL/ID record.	Participants used a photo of the valid ID of the facilitator, where the facilitator's photo was replaced with the participant's selfie, to initiate the age-verification process. At screens 7 and 8, they were instructed to edit the information with their own. At screen 11, they were instructed to take a selfie.
Scenario 6	Minors (below the legal age) provide to the App non-official DL/IDs that include the following: 1. Their own photos on the non-official DL/IDs. 2. Name and DOB information that matches an official DL/ID record.	Participants used a photo of the valid ID of the facilitator, where the facilitator's photo was replaced with an aged photo of the participant, to initiate the age-verification process. At screen 11, they were instructed to take a selfie.
Scenario 7	1. Non-minors complete age verification on their own phone and activate device. 2. The non-minors give the device to minors.	Participants used a photo of the valid ID of the facilitator. At screen 11, the facilitator provided a selfie. Once the facilitator was age-verified, the revalidation process began. At the screen prompting for another selfie for revalidation purposes, the participant provided the selfie.

Table 3. Scenarios Tested by Each Age Group

Group Number	Age Group	Scenarios Tested
I	16 – 20 year old	1,2,3,4,5,6,7
II	21 – 24 year old	1,2,7
III	30 – 49 year old	1,2,7

## Results

**Table 4** summarizes the results of all attempts to validate under the different scenarios. Scenarios 3, 4, 5, and 6 tested scenarios where the respondents were under LA and they attempted to defeat the age verification application. LA subjects did not test these scenarios. **In all scenarios tested none of the 16-20 years old individuals were able to validate that they were over the LA of 21.** This demonstrates that under the conditions of this test that the age-gating functionality is effective in preventing under LA activation and use of the product. In the 21-24 years old group some subjects had trouble validating mainly due to a failure in the biometric scan. All of the 30-49 years old participants were able to age verify and revalidate allowing continued use. Some of the subjects had to make multiple attempts to revalidate due to difficulties in the biometric scan's age estimate.

Table 4. Summary of Attempts to Validate Age under Different Test Scenarios

Age Group:	16-20			21-24			30-49		
	# Attempts	# Validated <21	# Validated ≥21	# Attempts	# Validated <21	# Validated ≥21	# Attempts	# Validated <21	# Validated ≥21
Scenario 1	103	103	0	20	18	2	10	0	10
Scenario 2	48	48	0	18	18	0	8	8	8
Scenario 3	49	49	0	Not Tested			Not Tested		
Scenario 4	64	64	0	Not Tested			Not Tested		
Scenario 5	53	53	0	Not Tested			Not Tested		
Scenario 6	40	40	0	Not Tested			Not Tested		
Scenario 7	27	27	0	15	12	3	9	0	9

## Conclusions

This study demonstrates under **simulated conditions** that the age-gating technology that will be used with the Glas G2 pod based vaping system **effectively prevents under legal age individuals from activating and using the product.** The subjects in group 2, just over the LA (21 -24) experienced difficulties in age verification primarily because of their young appearance or using IDs that were not updated after they became of LA. **An actual test of the age gating technology was performed and is reported in Poster 74.**