



# SentryCom VoiceShield® Functional Test

*Test report prepared under contract for SentryCom Ltd.*

## Executive Summary

SentryCom commissioned The Standards Institution of Israel an affiliate of eTesting Labs Inc., a Ziff Davis Media Company, to validate the overall functionality of VoiceShield®, by simulating a real-life typical usage scenario and to test the performance of Biometric Voice Authentication security layer in a controlled environment

The test was carried out using a heterogeneous population of 50 people. The population was comprised of an equal number of males and females of varying ages with no participant being under the age of eighteen.

The purpose of the Biometric Voice Authentication test was to record the failure rates of users enrolling in the system, users authenticating their own voice sample and of imposters trying to match another users voice sample or by the use of a tape recording of the users voice. The test also checked the voice variability over time, effect of background noise, common cold effects, users learning cycle and use of the system by non-native English speakers.

The following failure rates of Voice Authentication layer were measured:

- Failure to enroll – system unable to store a voice template of sufficient quality
- Failure to acquire – system is unable to capture a voice template of sufficient quality
- False non-match – genuine user fails to match his/hers own template
- False match – imposter matches a stored template

The test results reveal the following:

- The failure to enroll and failure to acquire rate was 0%.
- The false non-match (single attempt) rate was 1.2%, in all cases the next attempt was successful.
- The false match rate 0.6%. (achieved only if PC\_ID and PIN are compromised by the hacker).
- The false match rate for an imposter using a recorded voice sample was 0%.

# The Software Testing Center

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## About The Software Testing Center of the Standards Institution of Israel and eTesting Labs Inc.

### SentryCom

SentryCom Ltd. develops products for the internet/intranet personal authentication market.

Voice Shield® is a solution that allows users secure access from pre-registered PC to information using both a PIN number and voice authentication. SentryCom speaker verification technology provides solutions to tighten security and reduce costs with the inherent convenience of the human voice. The company's speaker verification technology solves countless security problems that require accurate user identity verification, by providing powerful, non-intrusive and user-friendly solutions.

SentryCom solutions introduce 3-tier client-server verification architecture, which include behavioral biometrics of Voice Authentication and a proprietary combination of hardware and software identifiers. It can be seamlessly integrated with the enterprise Web Servers at multiple locations to provide private access.

### SII

The Software Testing Center of the Standards Institution of Israel is the leading software testing lab in Israel. The center is the only third party independent testing lab in Israel. The STC of SII is Israel's' first independent organization dedicated exclusively to testing the functionality, usability, and performance of hardware and software. STC/SII covers varied technologies including Internet, Multimedia, Security Products, Network Products, C/S and other applications. STC/SII is the first international affiliate of eTesting labs. For more information regarding this affiliation visit [www.etestinglabs.com](http://www.etestinglabs.com).

The Standards Institution of Israel - (SII) is the country's official body for the preparation and publication of Israeli standards. It is intensively involved in the testing and certification of nearly every type of local & imported consumer, industrial & building product available on the Israeli market, and in auditing & certifying quality systems. SII grants Standards Marks, Safety Marks and Green labels to products that have been tested and certified, and is one of the prime promoters of ISO 9000 in the country.

### eTesting Labs Inc.

eTesting Labs Inc. ([www.etestinglabs.com](http://www.etestinglabs.com)), a Ziff Davis Media company, leads the industry in Internet and technology testing. In June 2000, ZD Labs changed its name to eTesting Labs to better reflect the breadth of its testing services. Building on Ziff Davis Media's history of leadership in product reviews and benchmark development, eTesting Labs brings independent testing, research, development, and analysis directly to publications, Web sites, vendors, and IT organizations everywhere. For more information, email [etesting\\_labs\\_info@ziffdavis.com](mailto:etesting_labs_info@ziffdavis.com) or call toll free in the U.S. at 877-619-9259.

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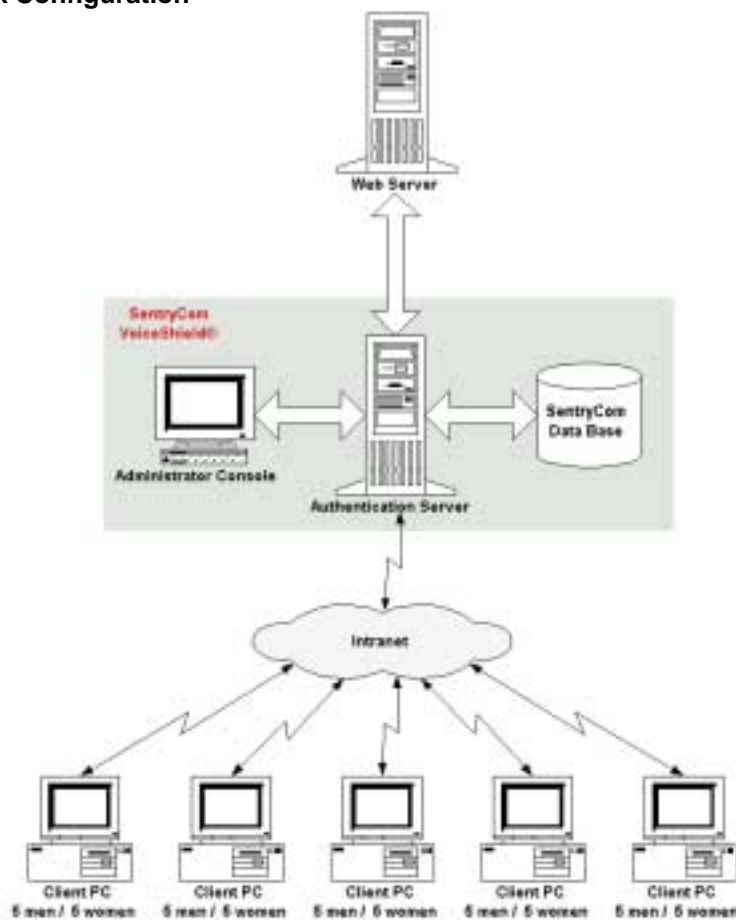
## Test Methodology

### Objective

The objective was to validate the overall functionality of the VoiceShield system and to test the performance of the Voice Authentication layer of the 3-tier authentication ..

### Setup

#### Network Configuration



#### Detailed Configuration

The Domain Server -Windows 2000 operating system with Dual CPU \_500MHz and 1000MB RAM was installed using SentryCom Installation CD-ROM pack which includes: SentryCom's ISAPI filter(on IIS Web Server), ISAPI-Redirect DLLs (on IIS Web Server), SentryCom Authentication Server, SentryCom Consumer Server, SentryCom databases, Administrative tools and other tools including Sun JDK 1.3, ORBACUS CORBA, iSaSilk SSL and Apache Tomcat.

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In addition the server was installed with Administrative Performance Monitor and Test Home Page on the IIS Web Server.

Each Client (Windows 98 operating system and Internet Explorer 6.0 ) with CPU \_933MHz and 128MB RAM was installed with VoiceShield client software, a sound card, and a standard PC headphone.

All System clocks were synchronized.

## Method and Measurements

The test was comprised of four parts carried out over three time intervals (see Test Procedure):

1. Enrollment where each user registers with the system and records a voice sample. Each enrollment included at least 6 “English “ double-digit prompts . Each prompt takes about 5 seconds to complete and includes about 2 seconds of speech.
2. Genuine transactions, which is a good faith attempt by a user to match his/her own stored template. Each authentication includes at least 2 random “English” double-digit prompts .
3. Imposter transactions, which is an attempt by a user to match his/her voiceprint to a stored template of another registered user, entering another user PIN number.
4. If the user entered by mistake the wrong PIN number (i.e. the PIN number of the user not registered on that PC) then an appropriate message is displayed and no voice match is performed.
5. Recorded voice imposter transactions, which is an attempt to match a user’s recorded voice with his/her stored template. The user was recorded during his successful authentication attempt . Then his voice sample was played back and the attempt was made to authenticate using the recording by the Testers and VoiceShield® system .
6. The test was performed under normal office “ noisy “ environment and people were talking in the background throughout the tests.
7. Multiple PC stations were performing tests simultaneously.
8. A number of participants were suffering from head colds.
9. None of the testers were familiar with the systems operation prior to the test. They also received brief instructions immediately prior to undertaking the test.
10. The test was performed “live” and the authentication results were received immediately.
11. The participants were both native English speakers as well as non-native English speakers.

## Test Procedure

1. Day 1: Install the VoiceShield authentication server and client software on 5 workstations with sound cards, and headphone microphones.
2. Pre-register all users. Pre-fill Registration Form with the following information for each user: first name, last name, email address, gender, then using Administrative Performance Monitor a one-time user ID was issued for the following registration process.
3. Day 2: Enrollment: 10 users for each workstation. User performs all tests at the same workstation. All 50 users enroll on day 2.
  - i. Click on “Get your ID and Register” link inside Test Home Page (see Figure 1 in Appendix A)
  - ii. Enter your email address and press “Registration with ...” link (see Figure 2 in Appendix A)

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- iii. User talks into microphone to test sound
- iv. Pre-filled Registration Form is displayed – user checks and sets gender (male or female)
- v. User is prompted to speak and voice is recorded
- vi. User receives personal PIN number
- vii. Time of registration for each user is recorded
4. Day 2: First authentication: repeated 3 times.
  - i. User clicks on “Personal Test Authentication” link inside Test Home Page (see Figure 1 in Appendix A)
  - ii. Choose Local PC (not Telephone) Authentication (see Figure 3 in Appendix A)
  - iii. User is prompted for PIN.
  - iv. User is prompted to speak
  - v. Window appears either identifying the user correctly (his/her name appears on the Web page) or displaying “Authentication failed” message (see Figure 4 in Appendix A).
  - vi. Pass/Fail results recorded.
  - vii. In case of authentication failed, user performs another attempt
5. Days 5-8: Second authentication –same users are tested on the same workstation where initial registration and authentication were performed.
6. Days 5-8: Imposter testing
  - i. Each user attempts to enter his personal Web page using his/her voice and the “PIN, where the PIN belongs to another user on the same workstation. (The scenario were PIN and PC-ID are compromised by the “hacker”)
  - ii. This procedure is repeated 5 times with 5 different PIN's as described in 6a.
  - iii. Pass/Fail results recorded for each attempt together with the time of each attempt.
7. Day 9: Recorded voice imposter testing
  - i. 6 users recorded an attempt to authenticate using a tape recorder.
  - ii. An impostor then attempted to enter the legitimate user personal Web page using his /her PIN and the tape recording of his/her voice. (The scenario were PIN and PC-ID are compromised by the “hacker”)
  - iii. Pass/Fail results recorded for each attempt together with the time of each attempt.
8. Days 9-14: Third authentication (as above)
9. Days 9-14: Second imposter testing (as above)

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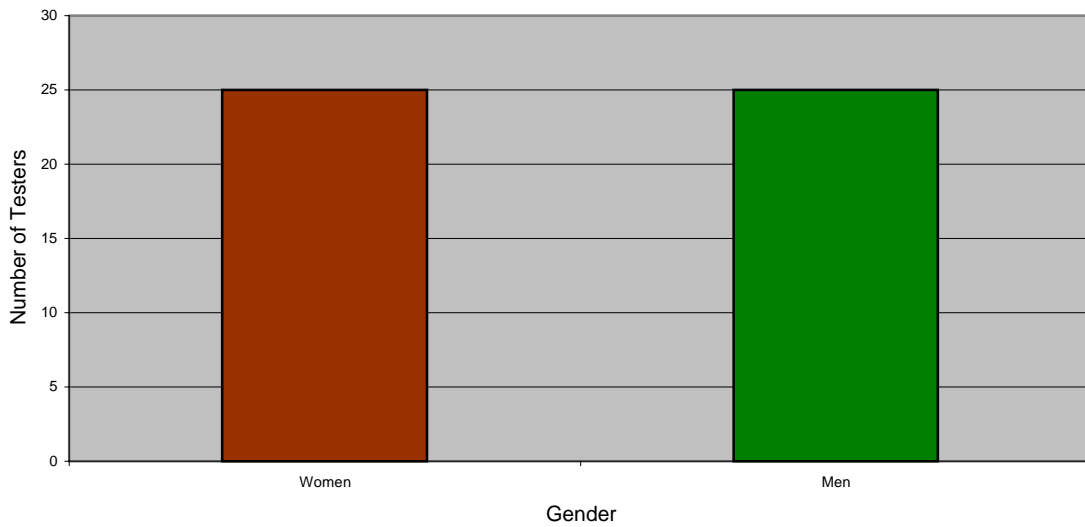
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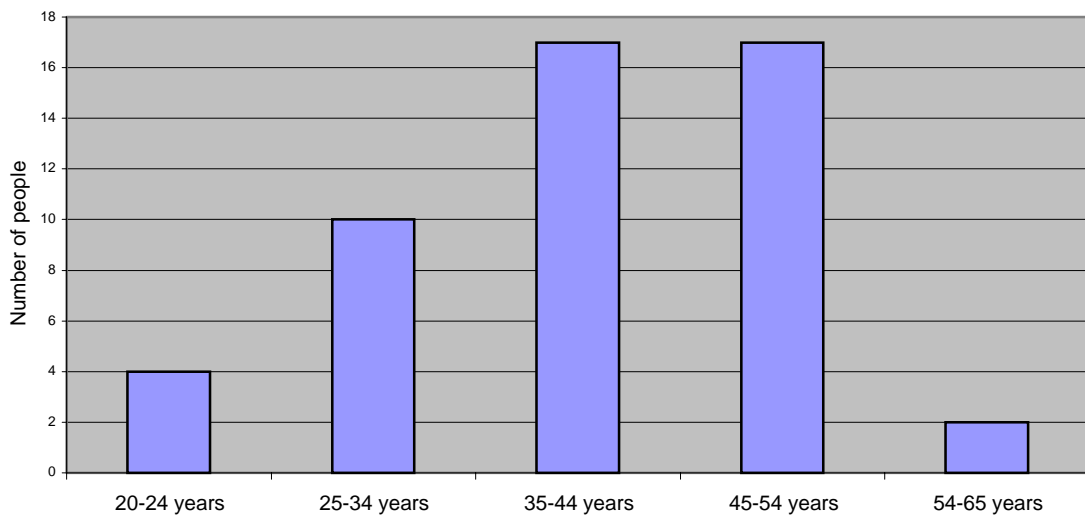
## Population

The population consisted of an equal amount of men and women including a wide spread of ages.

**Gender Distribution**



**Distribution of Age**



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### Ages of Testers (years)

	<i>Workstation 1</i>	<i>Workstation 2</i>	<i>Workstation 3</i>	<i>Workstation 4</i>	<i>Workstation 5</i>
53	45	44	29	39	
38	52	39	41	38	
28	49	50	48	23	
27	50	49	52	32	
52	40	50	30	29	
44	36	24	52	35	
28	45	37	61	44	
23	47	51	37	42	
40	22	53	51	27	
25	39	41	55	30	

### Data Collection

The data recorded was as follows:

- Successful enrollment – user enrolls
- Failure to enroll – system unable to store a template of sufficient quality
- Failure to acquire – system is unable to capture a voice template of sufficient quality
- Successful authentication - genuine user matches his/hers own template
- False non-match – genuine user fails to match his/hers own template
- Imposter not successful – imposter does not succeed to match a stored template
- False match – imposter matches a stored template

User errors include :

1. User failed to speak prompted double-digit combinations , resulting in authentication failure due to failure to match voiceprints .
2. User entered PIN code of the user not-registered on this PC.

Population information recorded for each user:

First name, last name, email address, user id, gender and age.

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## Test Results

### Day 2:

Enrollment for each user: 50 out of 50 attempts successful

3 Authentication attempts for each user: 150 out of 150 attempts successful

### Day 5-8:

Authentication attempt for each user: 49 out of 50 successful. The failure attempt was followed by a successful authentication attempt. One additional failure was caused by user failure to speak prompted double-digit combinations

5 Imposter attempts for each user: 250 out 250 failures

### Day 9-14:

Authentication attempt for each user: 48 out of 50 successful . The failure attempt was followed by a successful authentication attempt.

5 Imposter attempts for each user: 247 out of 250 failures

## Summary of Results

Failure to Enroll	0 (0%)	Total enrollment Attempts	50
Failure to Acquire	0 (0%)	Total attempts to acquire	50
False non-match	3 (1.2%)	Total attempts to authenticate	250
False match	3 (0.6%)	Total imposter attempts	500
Recorded voice false match	0 (0%)	Total attempts to authenticate with recorded voice	6

**Note : the false non-match rate refers to the single attempt . In all 3 cases the subsequent authentication was successful.**

■ **End of Report**

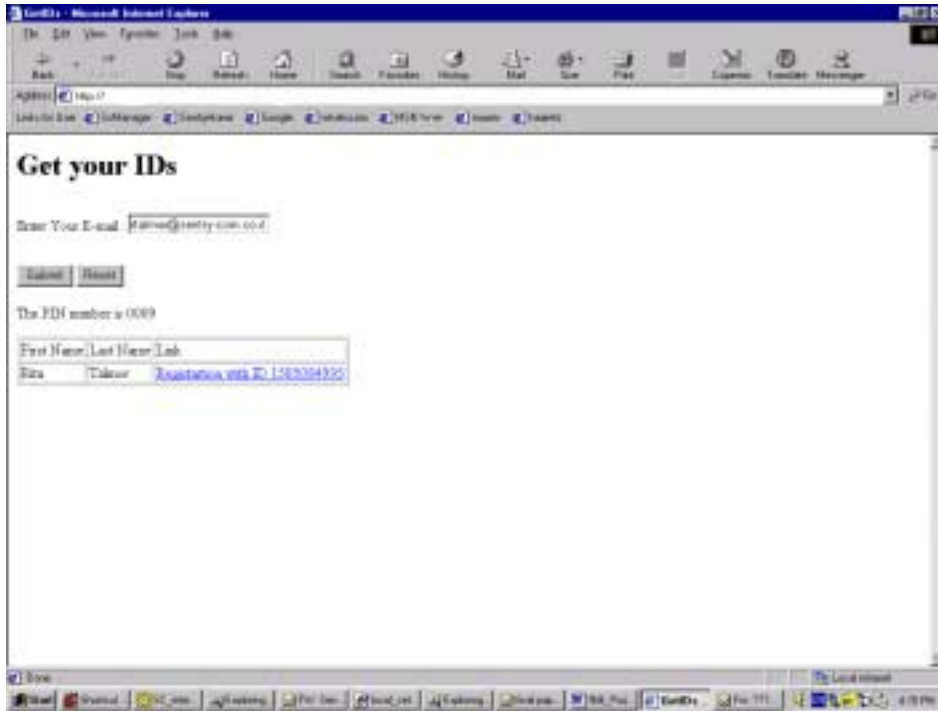


## Appendix "A"

Figure 1



**Figure 2**



**Figure 3**

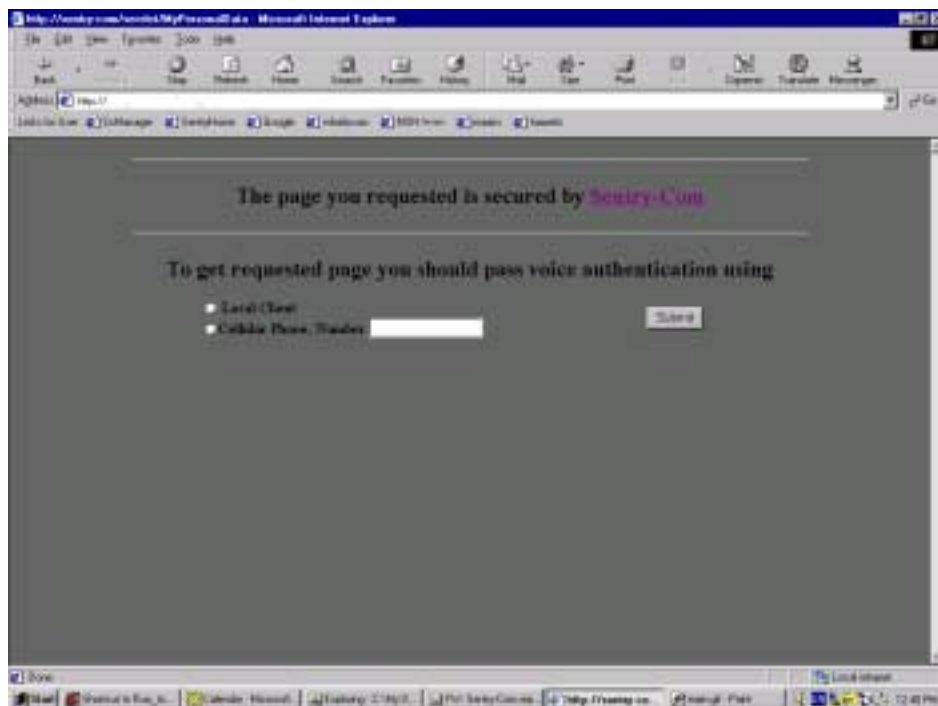


Figure 4

