

Phase II Location Accuracy Testing

**APCO/NENA Wireless E9-1-1
Implementation Plan Conference
Omni Mandalay Hotel, Irving, TX**

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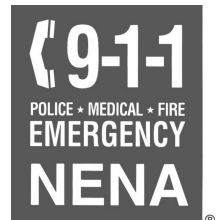
January 25, 2002



NENA Certification Program



- **Introduction and Overview**
 - **NENA/RCC Alliance**
 - **Benefits: Why is it necessary?**
- **Standards Compliance**
 - **FCC OET Bulletin # 71**
 - **Accuracy, Timing, Routing**
 - *PinPoint 9-1-1 Test*



NENA/RCC Alliance

- Two strong organizations devoted to the support and development of Public Safety communications.
- Membership in NENA
- Gold Membership in APCO
- Supporter of many NENA and APCO events.



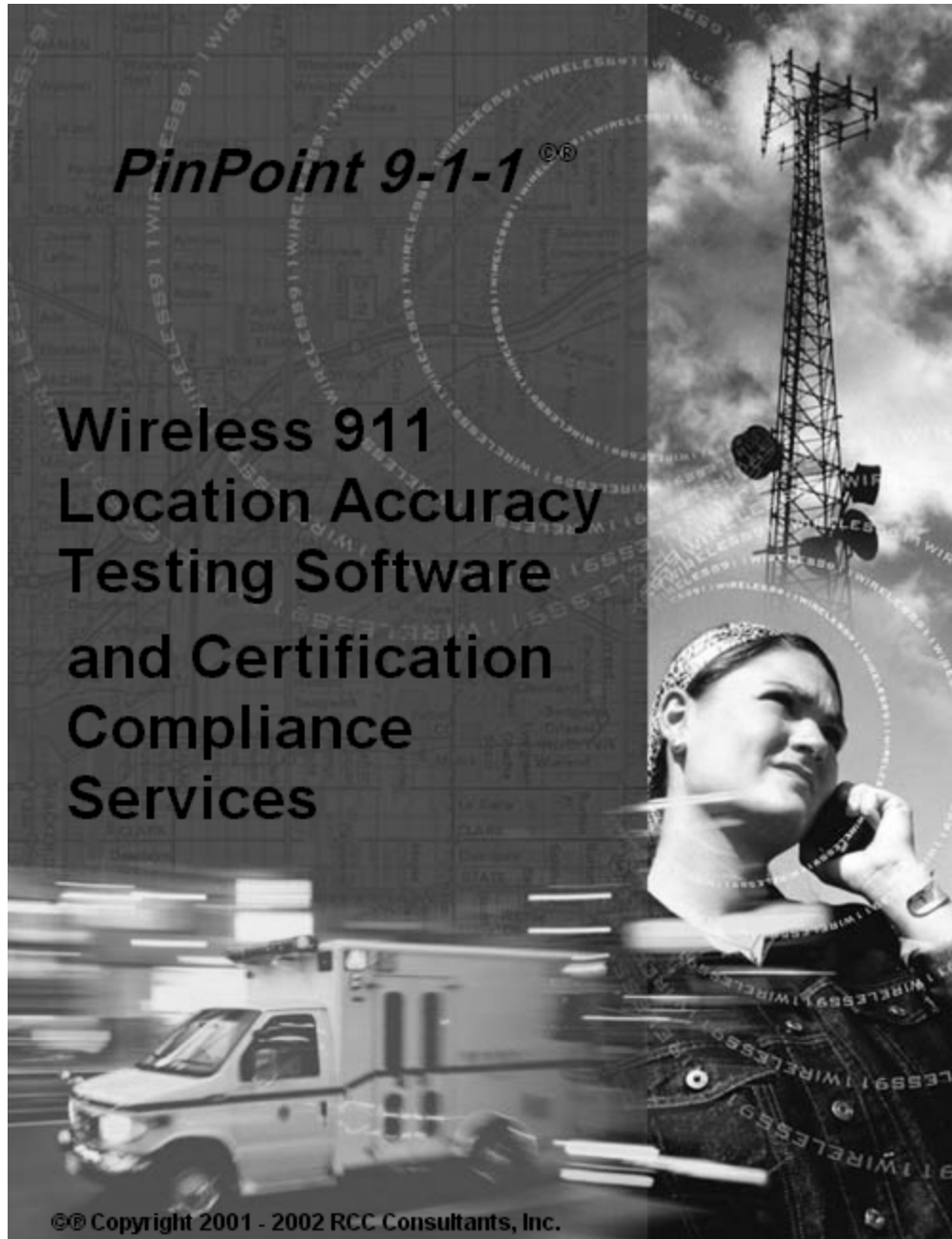
Benefits: Why is Compliance Testing Necessary?

- Offers independent review and assessment of FCC guidelines for location accuracy, routing and timing.
- Provides for corrective course of action should results fall below expectations.
- Fosters cooperation between the Public Safety community and carriers to work in the best interest of the public (cell phone subscribers).



PinPoint 9-1-1 [®]

**Wireless 911
Location Accuracy
Testing Software
and Certification
Compliance
Services**



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Compliance Assurance: *PinPoint 9-1-1*⁽¹⁾ Software

- Accuracy measured relative to a common Geographic Coordinate System, NAD83.
- High accuracy differential GPS with WAAS capability, better than 3 meter accuracy.
- Perform end-to-end tests inclusive of PSAP call taker equipment, cell sites and PDE technology.



(1) *PinPoint 9-1-1* is a copyright of RCC Consultants. All rights reserved. Patents are pending on *PinPoint 9-1-1* related tools and processes.



Wide Area Augmentation System (WAAS)

- 25 Ground Reference Stations
- Two Master Stations collect data and create a GPS Correction Message
- Correction Message is sent to GPS receivers over the basic GPS signal structure



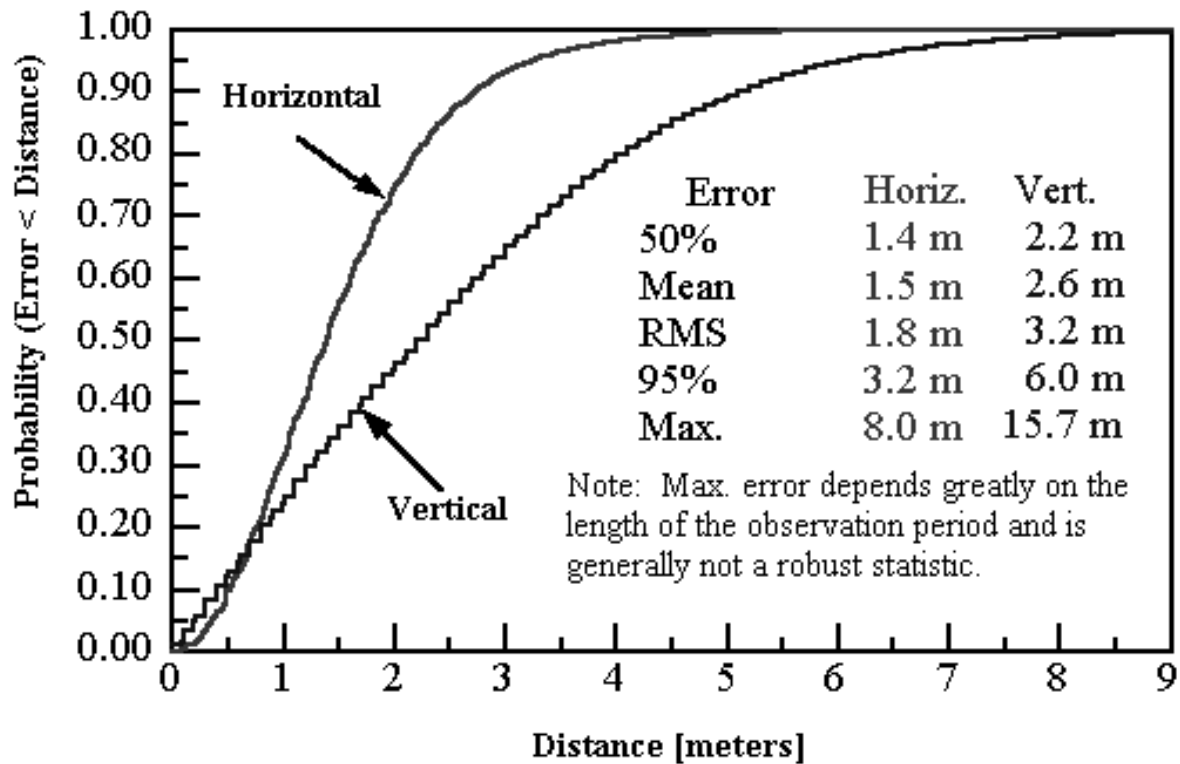
GPS Accuracy

- 100 meters with Selective Availability (SA)
- 15 meters without SA
- 3-5 meters typical with differential GPS
- < 3 meters typical with WAAS (95%)

Source: <http://www.garmin.com/aboutgps/waas>



GPS ACCURACY WITH WAAS ENABLED Garmin GPSMAP 76 with GA 29 antenna



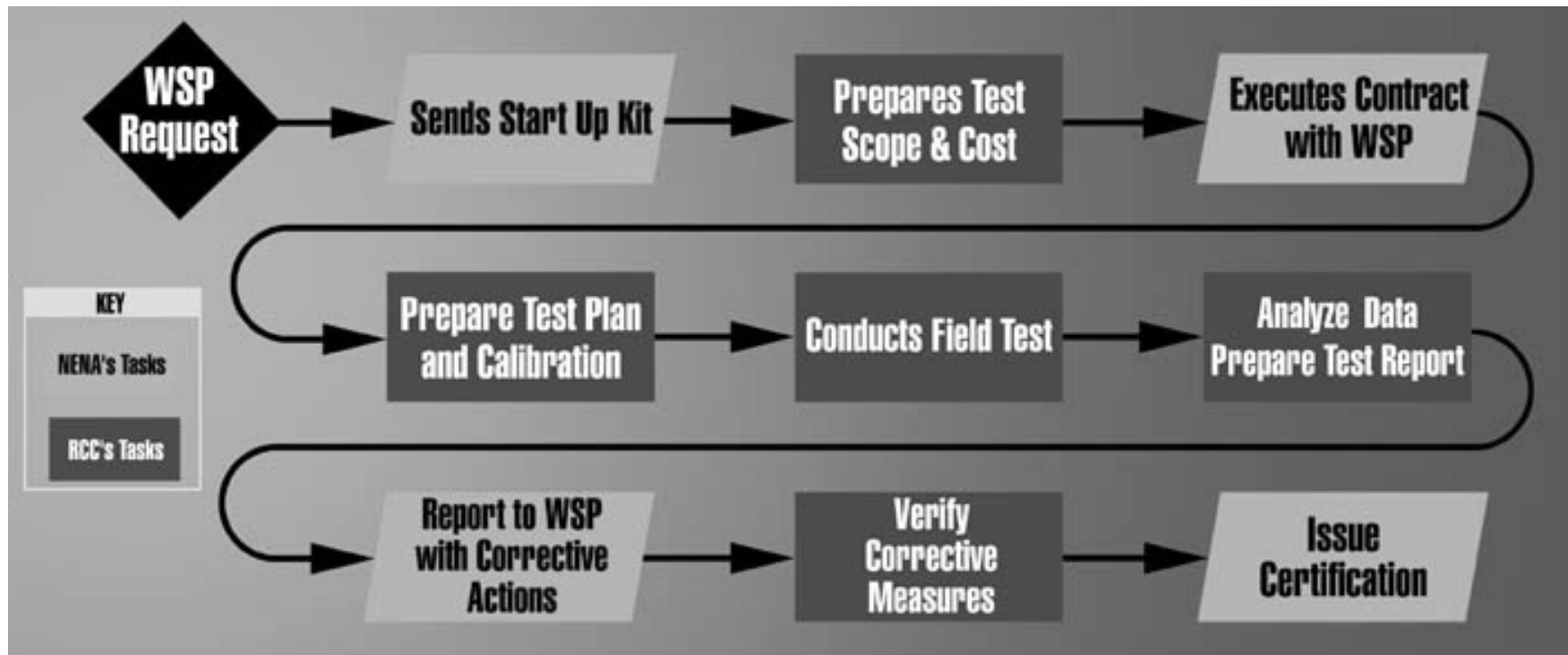
172815 observations (4 days)
Sample every 2 seconds



Graph and testing performed by David L. Wilson
<http://users.erols.com/dlwilson/gps.htm>



Certification and Testing Process





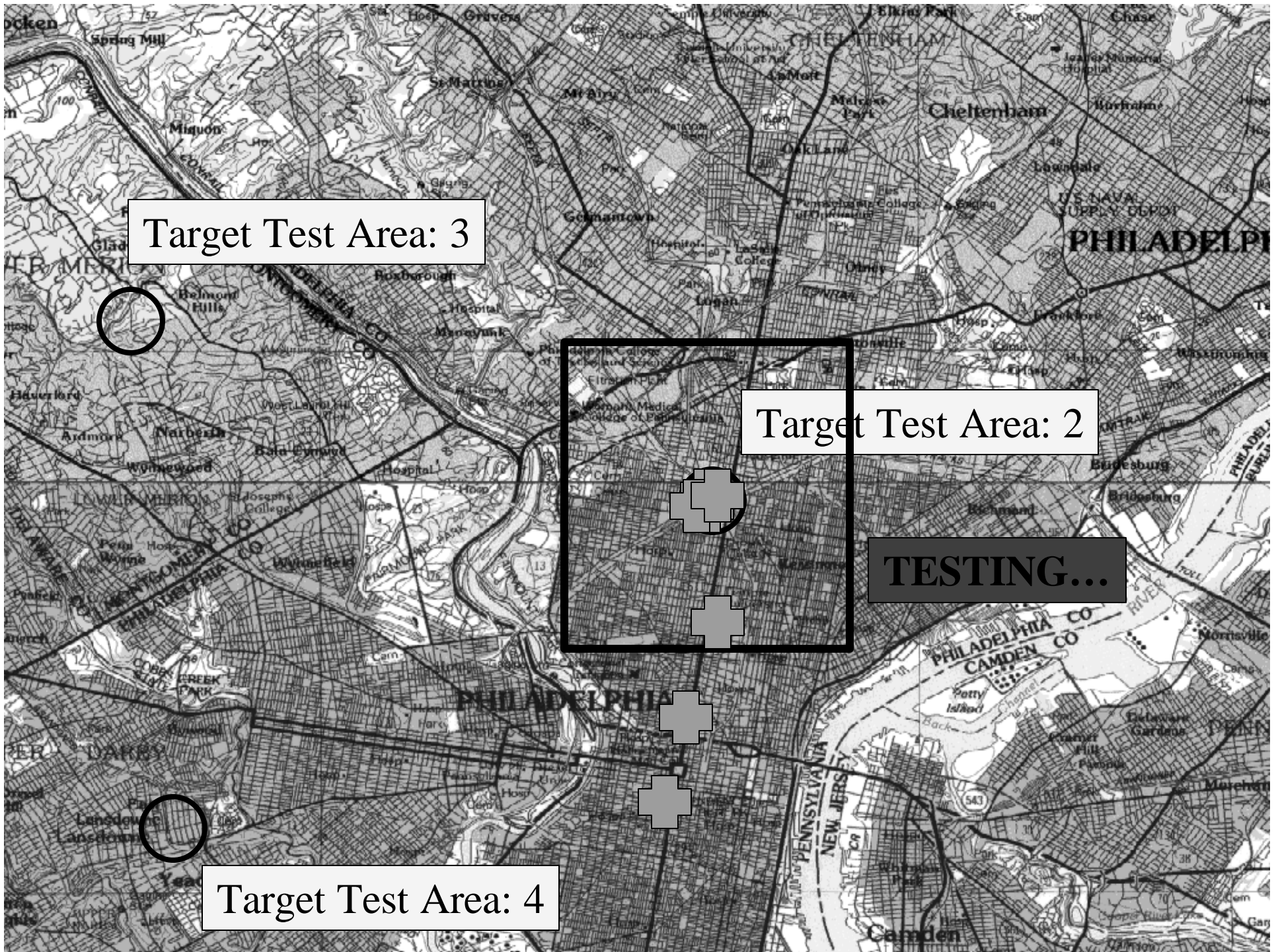
PinPoint 9-1-1

Wireless 911 Location Accuracy Test Set

- Tests multiple phones
- Tests multiple carriers
- **Self-prompting software to ensure a controlled data collection procedure**
- **Process eliminates possibility of biasing results.**

The screenshot shows a software window titled "Phone Profiles". On the left, there is a list box labeled "Profiles" containing two entries: "Motorola Talkabout" and "Motorola StarTac", with "Motorola StarTac" selected. Below the list are "Create" and "Remove" buttons. On the right, there are several input fields: "Profile name:" (Motorola StarTac), "Callback #:" (5105551212), "WSP:" (Wireless Carrier One), "Technology:" (CDMA 2000), "Model:" (T712312), and "Serial #:" (QDF30231E1). There are "OK", "Cancel", and "Clear" buttons at the top right.



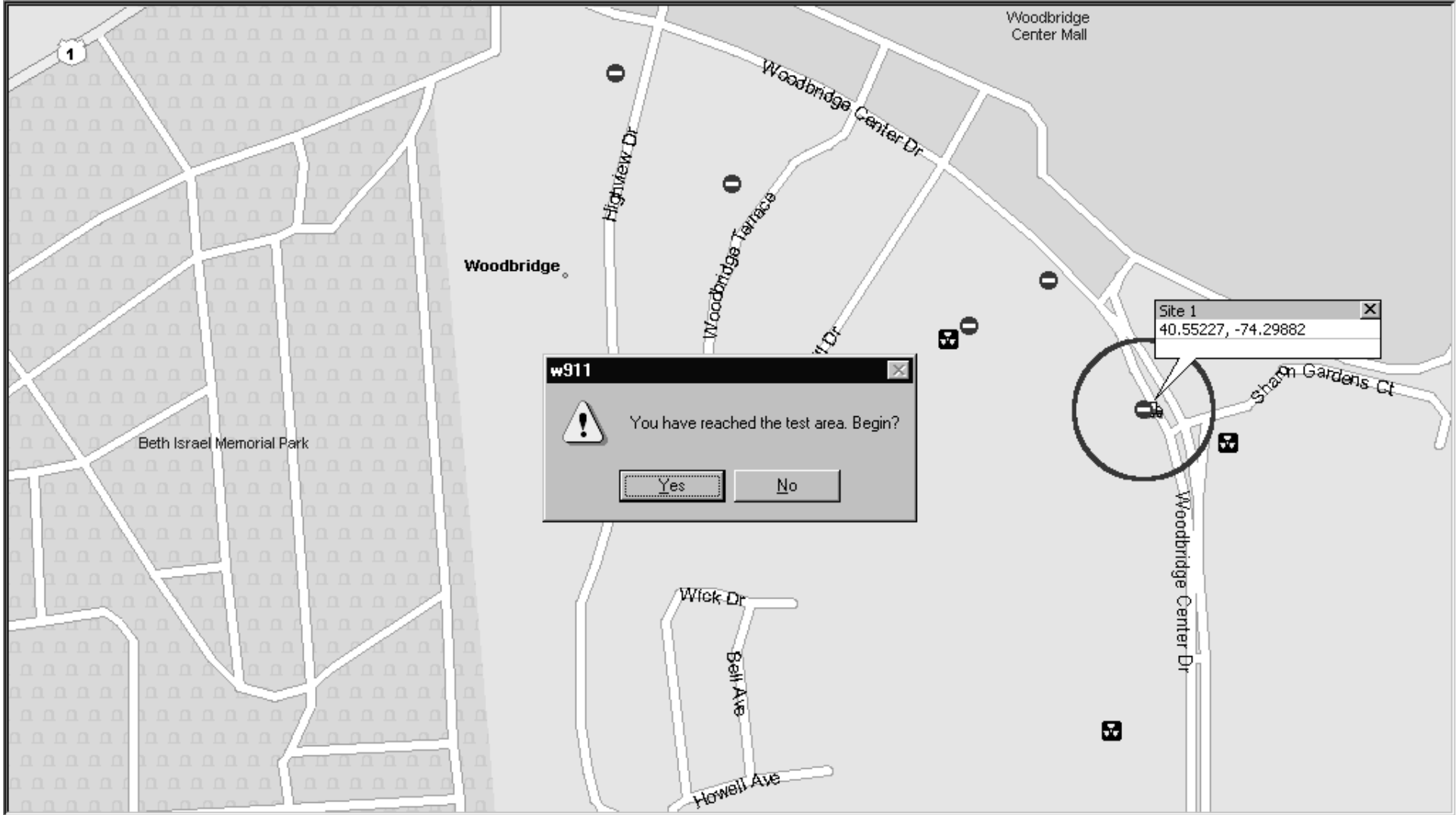


Target Test Area: 3

Target Test Area: 2

TESTING...

Target Test Area: 4



— Test site reached. —
[TEST->START] to begin test.
[SESSION->SELECT NEXT SITE] to set new test site.

General Test Parameters

- Smallest area for testing is a County. Largest is a BTA (Basic Trading Area) and limited to where carrier provides services within test area.
 - Handset solutions: 50m for 67% of calls, 100m for 95% of calls.
 - Network solutions: 100m for 67% of calls, 300m for 95% of calls.
- Confidence is suggested to be 90% (p).
- A minimum of 384 samples are suggested to be taken at randomly selected locations to ensure we are 95% confident that the estimate of p is within 5% of error.



General Test Parameters

- Locations are geographically weighted based on land-line call distributions. If distribution is not known, weighting is not applied.
- Pass/Fail is based on accuracy only. Accuracy is depicted by environment type and as a composite value as per OET71.
- Tests are performed from within vehicles with portables at head level at areas safely accessible by a car.
- In-building tests are performed if a randomly selected test location happens to pinpoint a building.



Thank you.

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