

L. Robert Kimball & Associates

Wireless Accuracy Testing (WAT) Overview

Lee County, Florida

May 2008

Lee County Breakdown

- **570+ Square Miles**
- **Population 544,000 in the off season**
- **Over 750,000 in season**
- **Seven Wireless Service Providers (WSP)**
 - **Alltel** - CDMA air interface, A-GPS for location information
 - **AT&T** - GSM air interface, network-based solution for location information
 - **Metro PCS** - CDMA air interface, A-GPS for location information
 - **Nextel** - iDEN air interface, GPS only for location information
 - **Sprint** - CDMA air interface, A-GPS for location information
 - **T-Mobile** - GSM air interface, network-based solution for location information
 - **Verizon** - CDMA air interface, A-GPS for location information

Testing Methodology

- Kimball uses a widely known and accepted data collection process called *Statistical Analysis (SA)*
- SA provided a template to allow Kimball to apply strict collection methods pertaining to WAT
- Two methods of SA are Mathematical and Geographic.
- These two methods assisted Kimball to determine test site locations
- Mathematical used a **random generation algorithm** based on latitude and longitude coordinates to generate locations
- Geographic (grid) method determined how many sites to test.

Standards

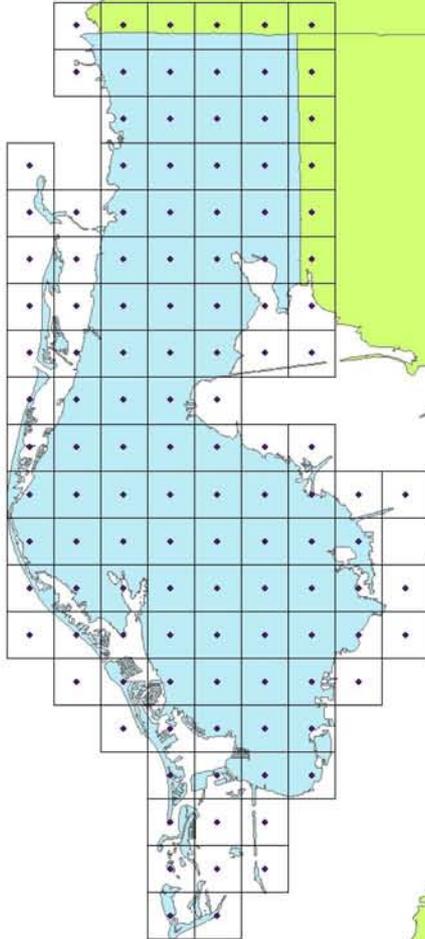
- **Kimball meets or, in many cases, exceeds any recommendations or standards in print today.**
 - **FCC 94-102**
 - **FCC OET 71**
 - **FCC 07-166**
 - **NENA (02-014, Issue 1)**
 - **APCO (Locate Final Report)**
 - **ESIF**

Mathematical (algorithm)



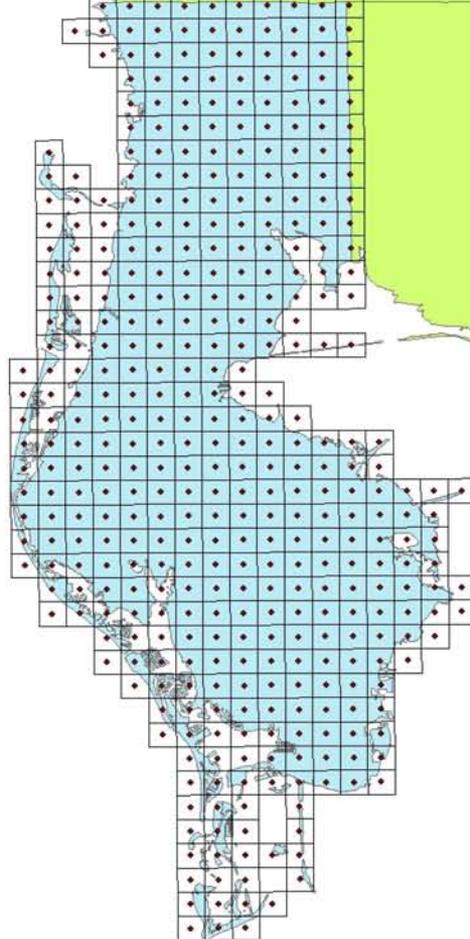
Geographic (grid)

2 Mile Grid



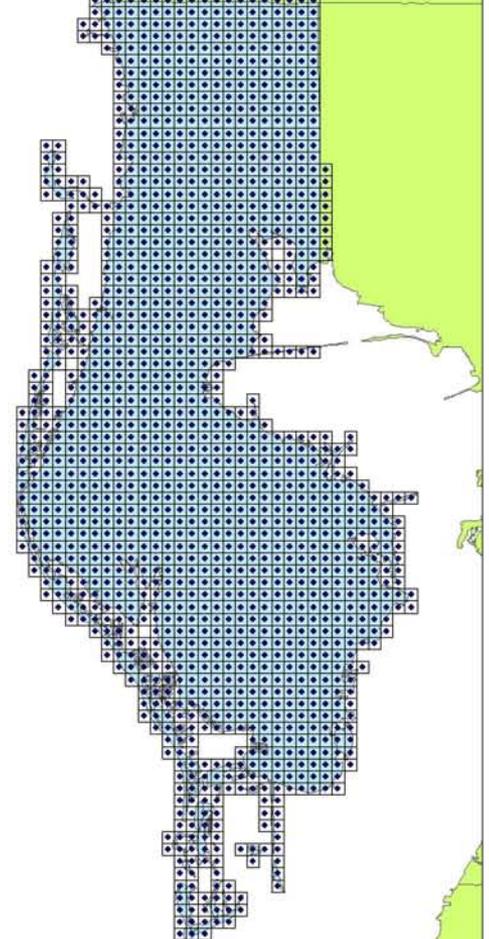
122 total # of grids that overlay the County
72 of the grids have a centroid that is in the County

1 Mile Grid



409 total # of grids that overlay the County
297 of the grids have a centroid that is in the County

1/2 Mile Grid



1478 total # of grids that overlay the County
1144 of the grids have a centroid that is in the County

Data Collection

Possible

- Seven WSPs
- 50 sites
- 10 calls per WSP at each site with 3 re-bids per call
- (50 sites) x (7 carriers) x (10 calls) x (4 re-bids)
- ALI Spills: 14,000
- Calls: 3,500
- Carrier Tests: 350 (50 sites) x (7 carriers)

Actual

- Not every WSP had a signal at each site
- ALI Spills: 12,861
- Calls: 3216
- Carrier Tests: 328

Accuracy Determination

- **Using the data from the third re-bid, which was the fourth actual bid, the first bid being the initial call, Kimball determined the accuracy compliance of each WSP in the county, including:**
- **Actual X, Y of the location of the call**
- **X, Y location, as provided by the WSP, for each initial call and three re-bids (four bids total)**
- **Tolerance zones (acceptable FCC threshold and uncertainty obtained during test call – dependant upon the WSP technology employed)**

Results

- **Alltel – Compliant**
 - **AT&T – Non Compliant**
 - **Metro PCS – Non Compliant**
 - **Nextel – Compliant**
 - **Sprint – Compliant**
 - **T-Mobile – Non Compliant**
 - **Verizon – Compliant**
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- **4 out of 7 WSP are compliant**

FC C Accuracy Standards

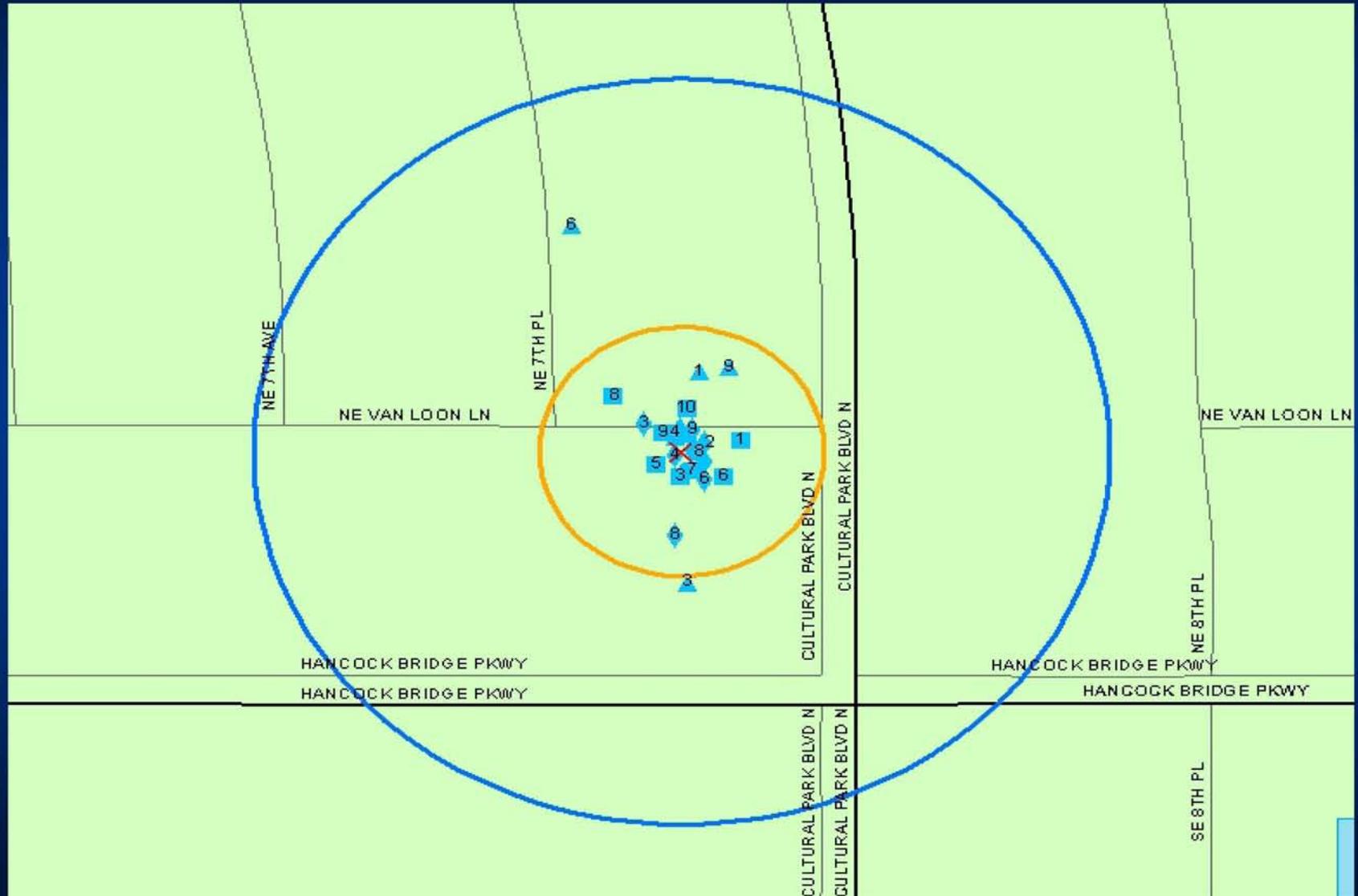
- **Network-Based Solutions**

- **67% of all calls to be within 100 meters (Gold)**
- **95% of all calls to be within 300 meters (Blue)**

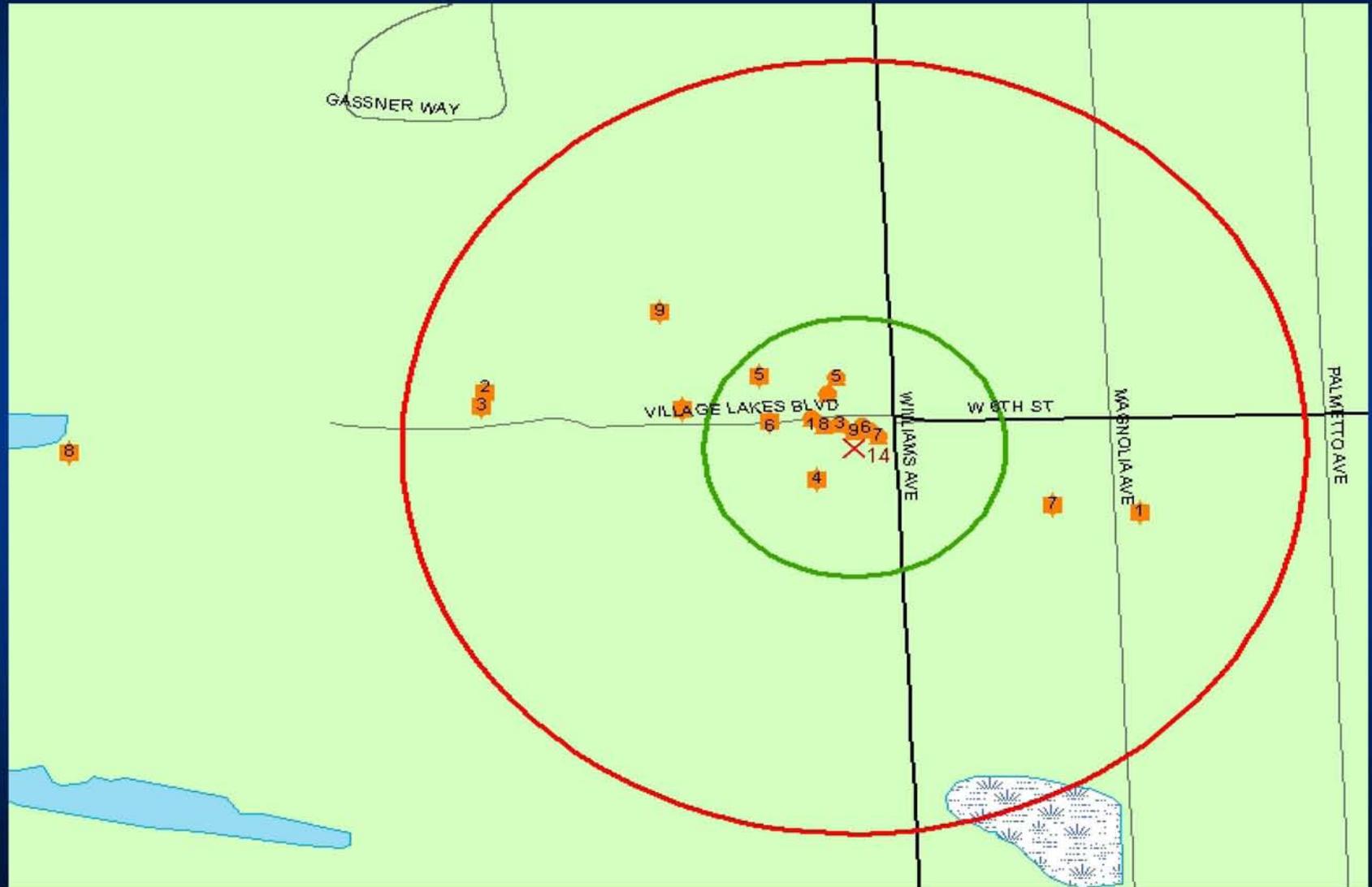
- **Handset-Based Solutions**

- **67% of all calls to be within 50 meters (Green)**
- **95% of all calls to be within 150 meters (Red)**

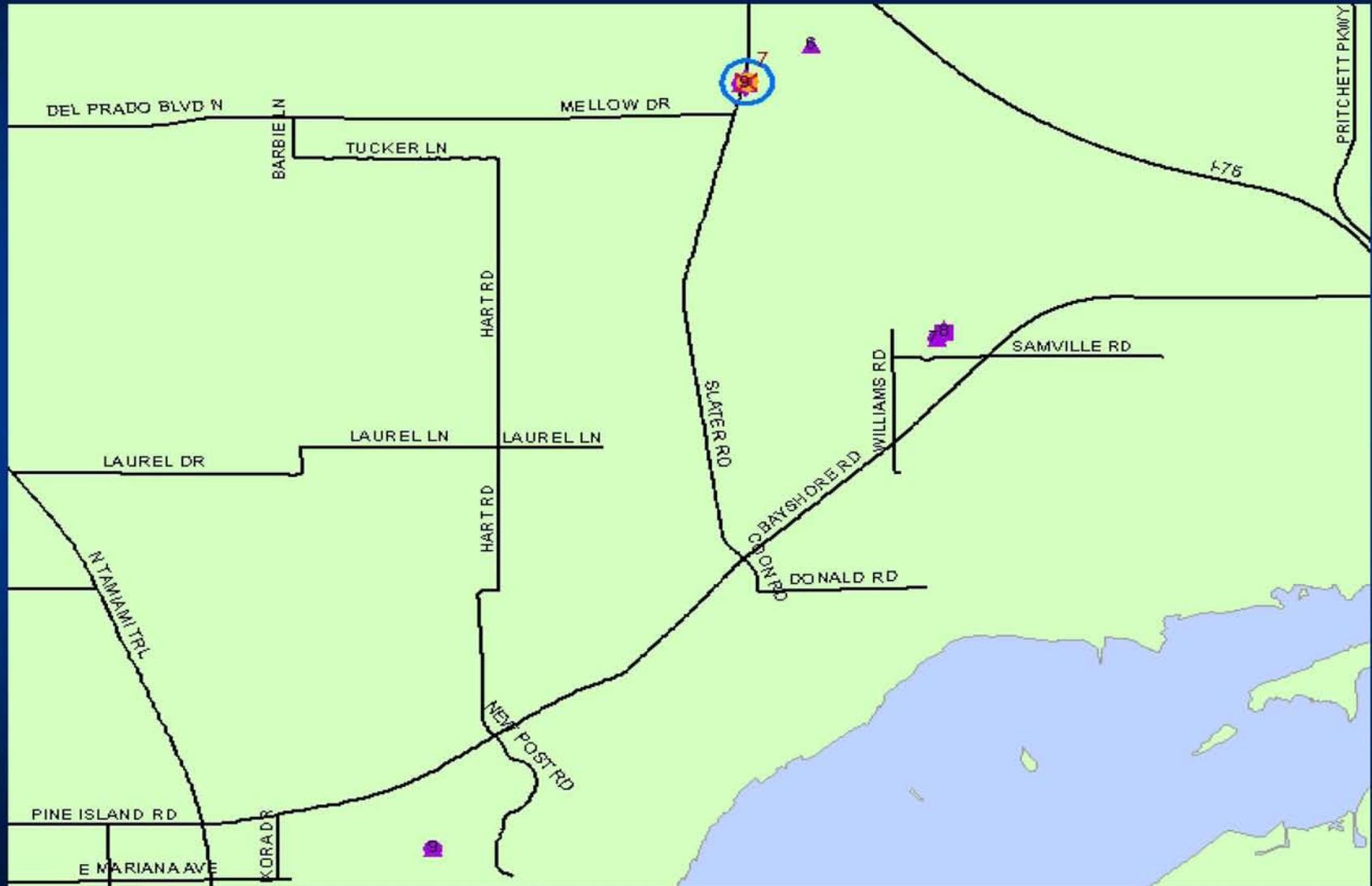
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AT&T



Metro PCS

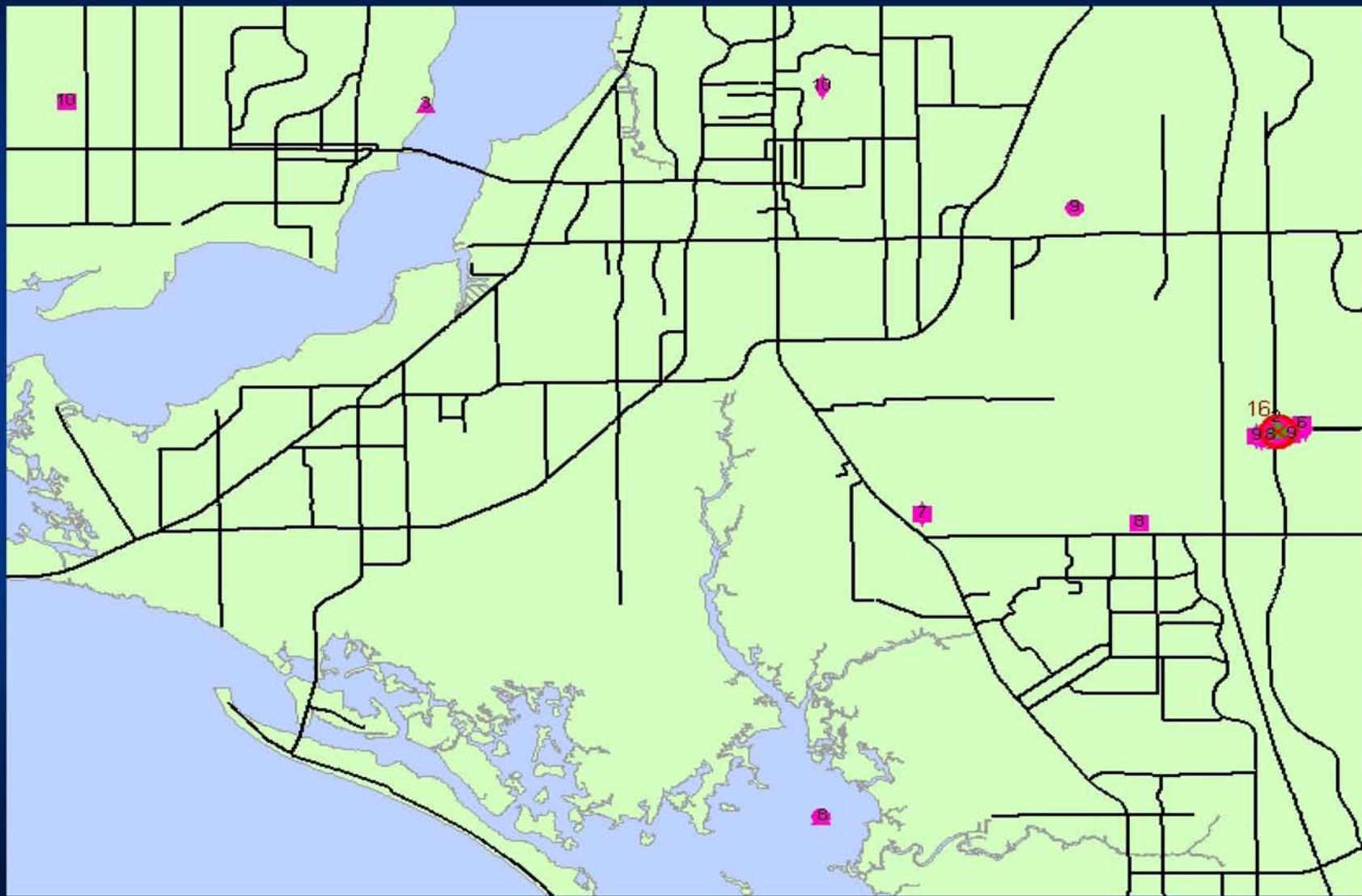




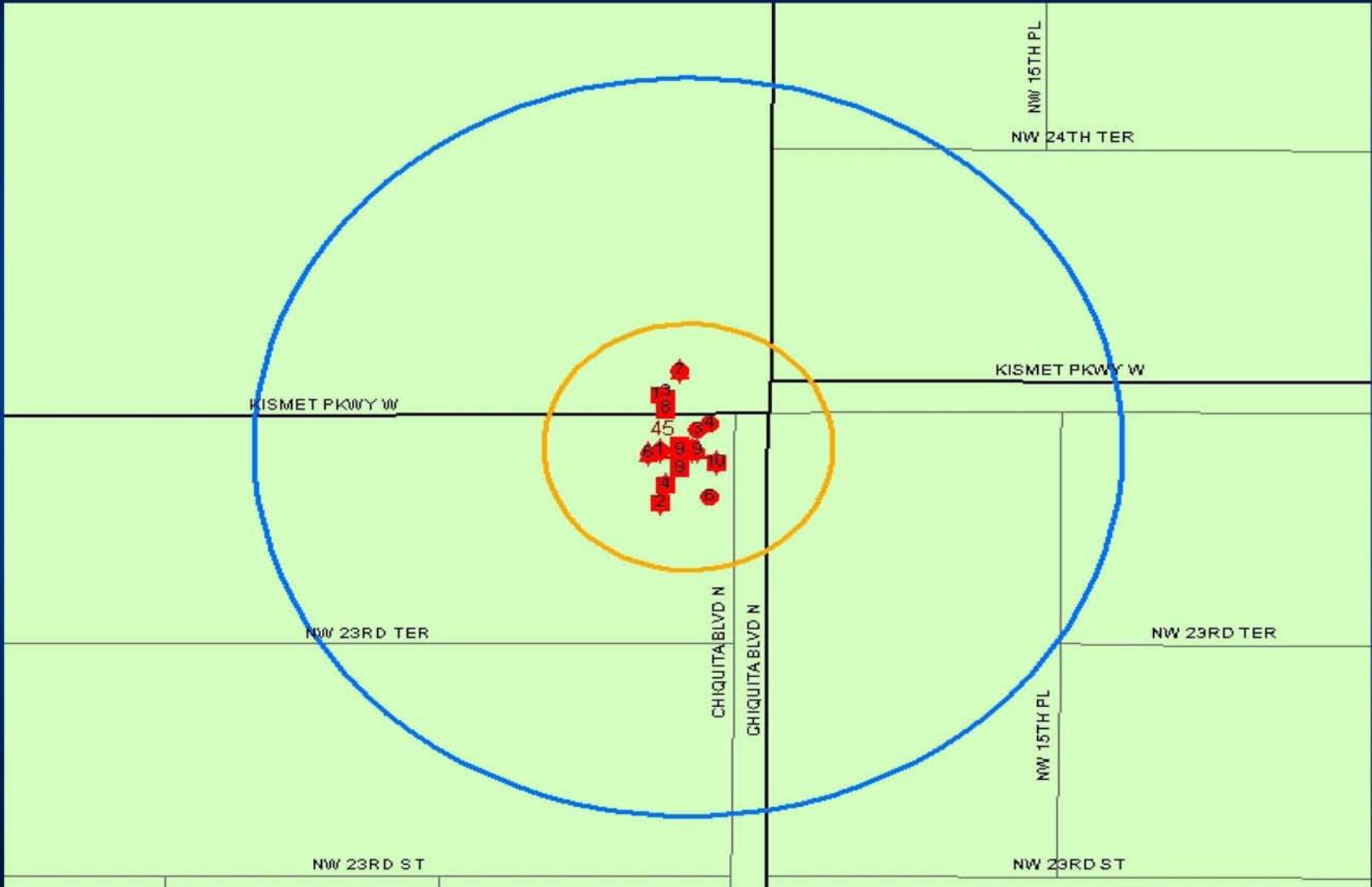
Sprint



T-Mobile



Verizon



Worst Call (Call Plotted in Atlantic Ocean near Miami)

