

## Cell tower junk science

*Despite claims to the contrary, cell phone tower evidence cannot reliably place a suspect near a crime scene*

by MICHAEL CHERRY, EDWARD J. IMWINKELRIED, MANFRED SCHENK, AARON ROMANO, NAOMI FETTERMAN, NICOLE HARDIN AND ARNIE BECKMAN

*FCC rules dating back to the late 1990's require wireless carriers to identify a 911 caller's location within one-fifth of a mile. Wireless carriers comply by simultaneously using three or more cell towers or GPS satellites to calculate the callers' latitude and longitude. Inexplicably, at many*

*criminal trials the prosecution uses a different approach based only on one or more call detail records supplied by the wireless carrier. This inferior method can only be used to establish the caller was within a 25 mile radius of the cell tower specified in each call detail record.*

Investigators frequently use cell phone tower information in an attempt to place a suspect near a crime scene, and for years prosecutors have successfully convinced jurors that the data from a single cell phone tower can reliably specify a person's location at the time of a call. But in reality it takes GPS tracking or simultaneous ping information from at least three different locations to locate or track a caller and to determine his or her latitude and longitude. Prosecution experts acknowledge that the use of accounting department call detail records cannot precisely determine a caller's location, since the caller need not be immediately adjacent to the cell tower, but they suggest that the accounting data proves that the caller was within a mile—or five miles—or ten miles—of the tower. The problem is that their underlying claim is false even when it is

combined with the following information:

- Cell tower latitude and longitude and street address;
- Telephone company drive test maps that validate cell phone reception within the intended coverage areas;
- Maps showing radio frequency (RF) coverage for each cell tower;
- PowerPoint® representation of defendant's travels based on serial multiple tower tracking; and
- Antenna information.

The Federal Communications Commission understands the relevant science. That is one of the reasons why they have mandated that wireless carriers provide Emergency 911 location information by one of two methods:<sup>1</sup> **handset-based**, where location information is generated by GPS or similar technology installed in the caller's handset, or **network-based**, where location information is generated by analyzing the caller's wireless signal in relation to nearby cell sites in the carrier's network. The FCC's rules require wireless carriers to identify the caller's location for a specified percentage of 911 calls within a range of 50 to 150 meters for carriers that use handset-based GPS technology, and 100 to 300 meters for carriers that use network-based technology. No one who understands the relevant science would ever claim that data from a single cell phone tower is adequate. The following cases illustrate the limitations of cell phone tower evidence.

1. [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2011/db0713/FCC-11-107A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2011/db0713/FCC-11-107A1.pdf)



Timur Arbaev/ Glow Images

## Case 1

by *Nicole Hardin, Ocala public defender, and Manfred Schenk, expert witness*

*State v. Adrian Brown* was a murder case with an eyewitness and cell phone tower evidence. The evidence seemed overwhelming. And it was not only overwhelming, it seemed damning, placing the defendant in the area right after the murder and tracking him from Ocala to Miami in the hours following the murder.

The Assistant State Attorney listed a “network engineer” affiliated with Sprint the day of jury selection and the judge refused to exclude him. The State Attorney called the Sprint phone worker as their last witness. He gave a power point presentation, and the State’s rebuttal closing argument relied almost exclusively on how the “pings” of the defendant’s cell phone had proved their case. The Assistant State Attorney actually walked around the courtroom saying “ping, ping, ping” and tracking the phone in evidence to the defense table. However, the trial ended in a hung jury.

In the retrial the defense focused heavily on winning big concessions on cross from the engineer. When the state called the engineer the defense crossed him with questions on all the factors that affect which tower picks up a call. The engineer admitted other towers would pick up a call if there were tower updates or maintenance going on—and he had no idea if that was happening when the calls were placed. He admitted that GPS or triangulation (the use of determining location through multiple towers) was far more accurate than the method he was presenting. He also admitted that which tower picked up a call was determined by at least 20 different factors, and he had no idea if any of those were a factor in this case. In addition, he admitted that this was not at all an “exact science” and the biggest concession was that you could be picked up by one tower when you were not even using the phone in the radius of that tower. In plain English, his whole report could mean nothing—he could not say for certain that the

phone was used in the radius of the tower that registered the ping. The jury returned a verdict of not guilty. The defense was able to show the jury that the tower evidence was not the smoking gun—and it wasn’t enough to convict. Juries are willing to listen to arguments about the limitations of cell tower tracking—and acquit.

## Case 2

by *Aaron Romano and Naomi Fetterman, defense attorneys, and Manfred Schenk, expert witness*

In another case four co-defendants were testifying against the defendant and the State claimed to have indisputable scientific evidence placing him at the crime scene. Charged with home invasion, robbery, burglary, assault, larceny, accessory to kidnapping with a firearm, and conspiracy, he faced a potential 145-year prison sentence. The four co-defendants each had long criminal records and had made deals with the prosecution in exchange for their testimony against the defendant. With their conflicting stories and blatant personal motivation, the co-defendants could be challenged, their credibility undermined; however, there remained the evidence that the State trumpeted would conclusively demonstrate the defendant’s participation in the crime: cell phone tower “ping” data. Complete with propagation maps and tower locations, the State purported the defendant could be tracked by his phone calls to persons he knew as he progressed from his home to the site of the home-invasion, a concept that the State likened to a game of leap-frog.

This facile explanation of cellular technology, using a series of single cell towers as a tracking mechanism, aroused the suspicion of the court appointed attorney, who determined that, contrary to the State’s assertion a cell phone call does not have to use the closest tower or the nearest tower. The attorney demanded a Porter Hearing, Connecticut’s equivalent of a Daubert Hearing, to test the validity of the

State’s theory. At the hearing the State presented its expert witnesses, a former telephone company employee. The State’s expert was forced to admit that a cell phone call does not have to use the closest tower or the nearest tower. Ultimately though, the court deemed the cell phone ping evidence admissible, despite its inherent flaws, and so the case proceeded to trial.

At trial, the State again proposed that the defendant’s movements could be ascertained simply through examining cell tower location. The defense expert, however, explained to the jury that the State’s postulations were substantially contradicted by the scientific realities of cellular technology. In his closing, the defense attorney emphasized that the only accurate way to determine an individual’s location is through the use of a Global Positioning System (GPS). Unlike cellular phones, GPS operates using satellites. Pursuant to FCC regulations, cell phones are now required to contain GPS chips as part of an E911 initiative. This is so that emergency responders can accurately locate a caller in distress. If the methodology proposed by the State was at all accurate, there would be no need for the government to require GPS chips in phones. In fact, the only context in which this sort of tracking system is employed is criminal prosecutions. All other commercial industries and scientific communities, such as the trucking industry, eschew this process because it is unreliable in praxis and unsound in technique. *Even police departments employ GPS technology with their own employees.* A methodology that has been determined by independent government agencies not to be able to stake a caller’s life on should not now be accepted as reliable enough to risk a defendant’s liberty.

In the end, the jury viewed the “ping” data as precisely what it was: manufactured evidence designed to imply the defendant’s guilt. It did not work. The defendant heard the jury forewoman pronounce “Not Guilty” on all seven charges.

### Case 3

by *Arnie A. Beckman, deputy public defender, Denver, CO, and Manfred Schenk, expert witness*

In the first *State v. Johnson* murder trial the prosecution utilized an "expert" in the area of historical cell phone data records analysis to place the defendant near the crime scene on the night of the killing. His power point presentation showed a red dot moving around a map as a demonstration of the defendant's movements on the night of the offense. After hanging 11 to 1 in favor of guilt on felony murder and 6 to 6 on murder after deliberation the defense knew the areas it had to improve upon included confronting the cell records expert on retrial.

Their preparation assumed the prosecution's expert, a police detective who had attended about 80 hours of cell phone training in GPS, geo-location, and historical records, did not understand the technology

since he simply omitted from his first trial presentation any information regarding the process by which cell sites are selected to handle calls at a particular time. This omission left the jury with the impression that the proximity from the cell phone to the cell site was the determining factor. Therefore, he concluded in the first trial, a cell site near the crime scene that handled a call attributed to our client necessarily located our client in that area.

On cross examination in the second trial the prosecution's expert revealed that he actually possessed some knowledge on how the technology of a signal ends up at a particular site. From there he had to admit that some calls he analyzed and presented during his direct testimony were utilizing sites 3 to 4 miles apart in a single 30 second call, that this was common and possible for every call presented (including those attributed to our

client who lived 15 blocks from the crime scene), and that he did not have the recorded information to determine why those particular sites were utilized since he did not have records from the sites showing traffic volume on the night in question. In closing the prosecution conceded that the cell phone record and tower analysis did not show the defendant's location. They said the opposite in the first trial.

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Given the limitations of cell phone tower evidence, as demonstrated in the cases above, there is little reason for a good judge to ever allow such evidence in front of a jury. ★

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