Cellular Analysis & Geo-Location

Field Resource Guide

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Current as of March 2019

Disclaimer

Studying this manual and attending the basic training does **NOT** constitute an individual as certified to testify.

Cell analysis is a great investigative tool. However, testifying in court regarding cell phone records is difficult and requires significant training. Prior to testifying, CAST agents receive over **500** hours of training.

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CAST's Origin

CELLULAR ANALYSIS SURVEY TEAM

CAST brings unique expertise to cases in which cellular telephone information serves an important evidentiary role in the investigation. When necessary, CAST will utilize industry standard survey gear drive test equipment to determine the true geographical coverage breadth of a cell site sector.

Project Pin Point (PPP) uses the following data sets…

- Historical cell tower lists
- FBI Informants and liaison contacts (Community Outreach, etc.)
- Fugitive Warrant data and Megan's Law Sex Offender registry
- Other divisional crime data such as shootings, robberies, etc.
- Other data deemed appropriate such as visas, cameras, case information, etc. (i.e. DIVRT)

… Which are overlaid and analyzed using mapping software to support:

- Fugitive apprehension
- Informant development
- Enhancement of investigations for all investigative programs

***To obtain CAST services, e-mail cast@fbi.gov. An intake form link will be provided. After submitting this form, a CAST asset will be assigned your case.

CAST Mission & Structure

CELLULAR ANALYSIS SURVEY TEAM

Mission

The mission of the Cellular Analysis Survey Team (CAST) Program is to support FBI, along with state, local, and tribal investigations through the analysis of cellular call detail records (CDRs) and their associated tower information.

Priorities:

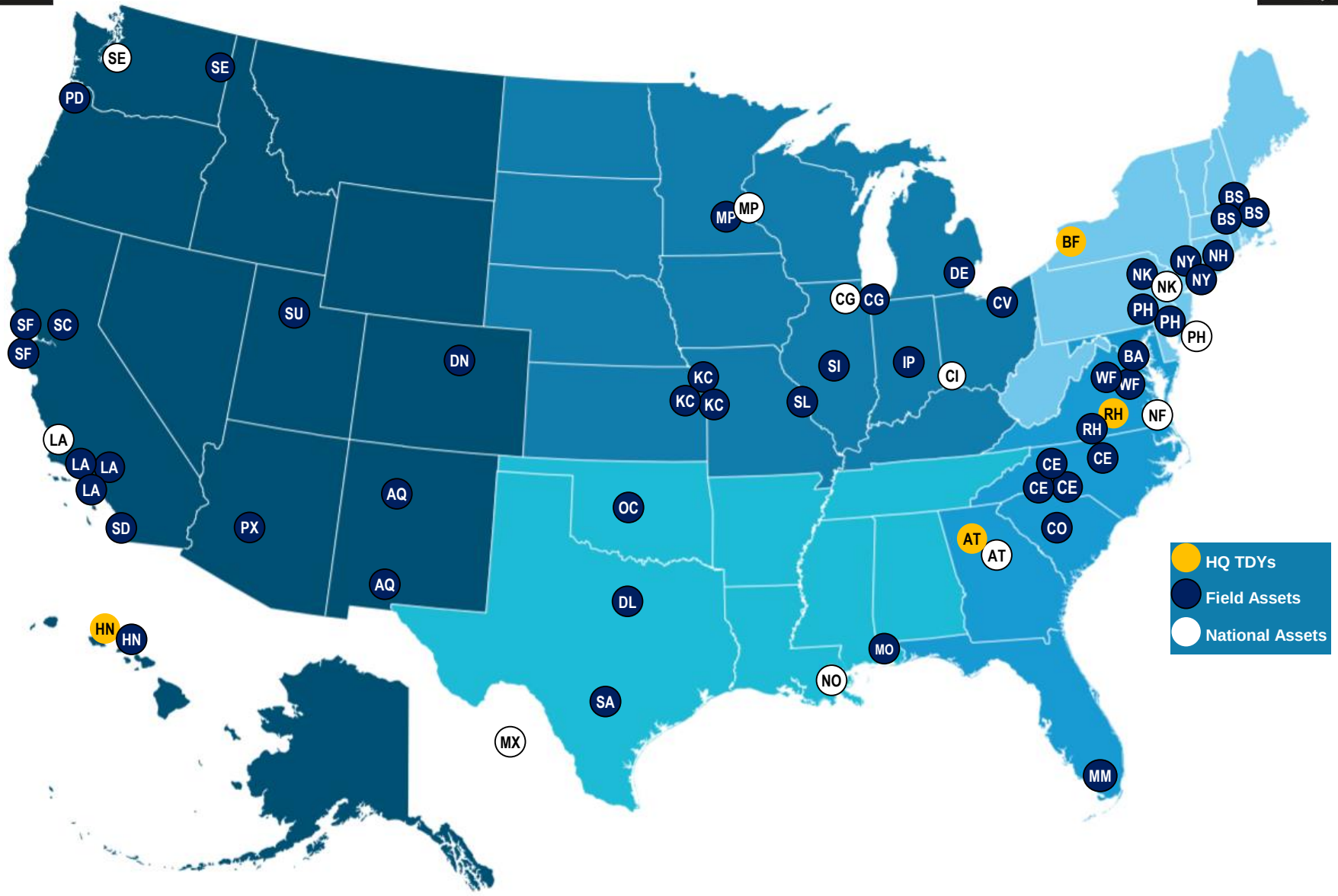
1. An immediate threat to life.
2. FBI priorities, to include National Security, Criminal, and Cyber.
3. Assistance to state, local, and other federal agencies.

Structure

The CAST Program is managed by the CAST Unit within the Operational Support Section of the Criminal Investigation Division (CID) with 5 HQ SSA's and 15 "National Assets," who are CID assigned Special Agents embedded within selected field offices.

The program also has over 50 CAST certified "Field Assets" who provide CAST analysis within their respective field offices.

Cellular Analysis Survey Team



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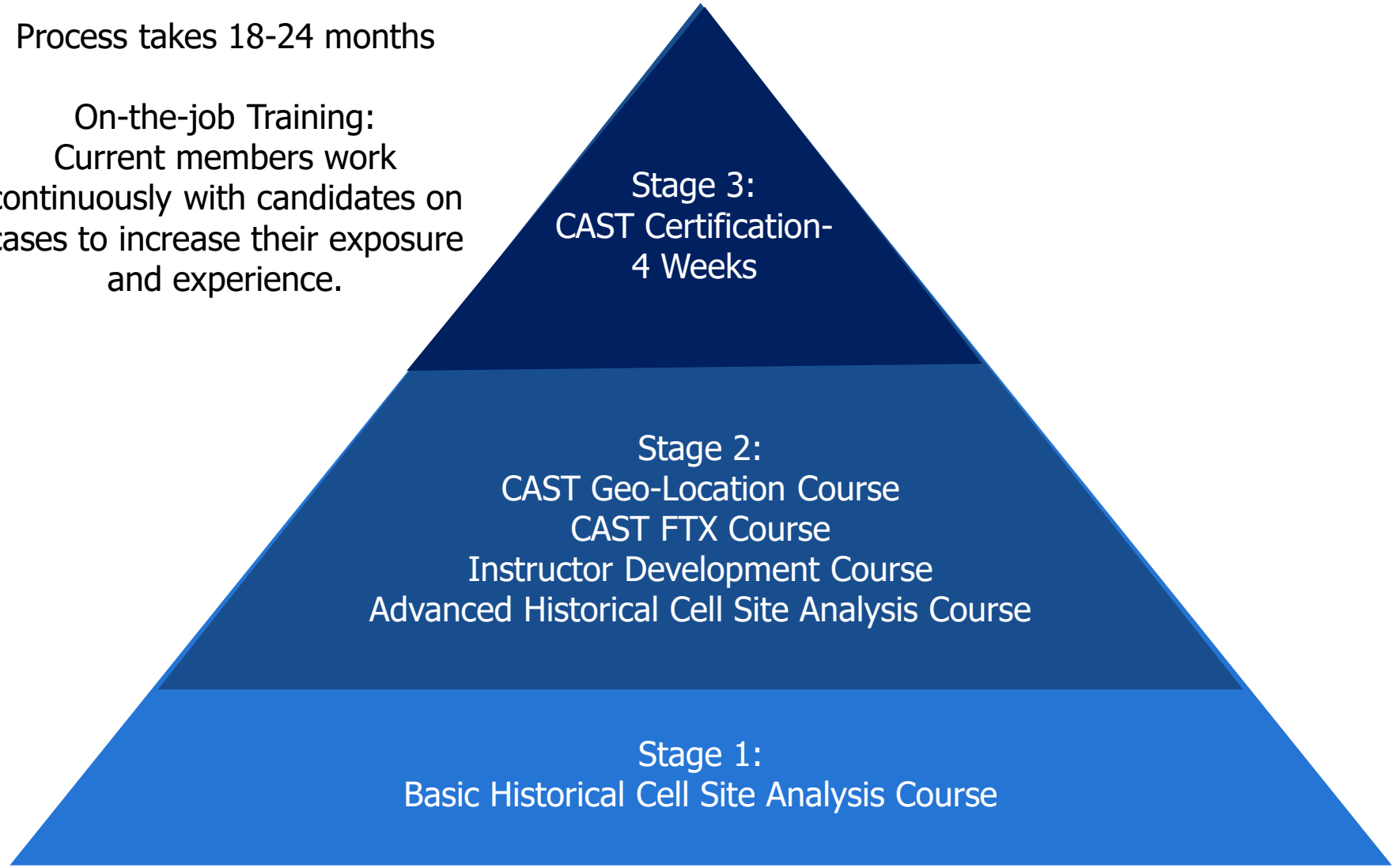
Required Training for CAST Certification

Process takes 18-24 months

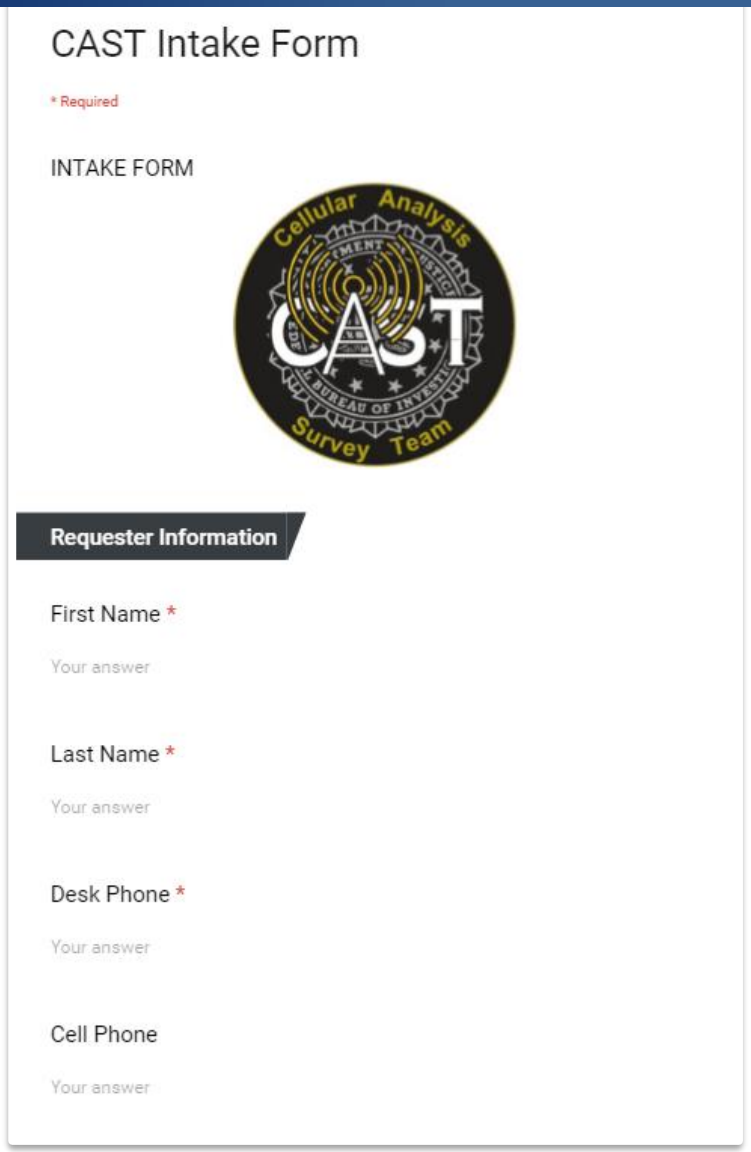
On-the-job Training:
Current members work continuously with candidates on cases to increase their exposure and experience.



CAST National & Field Asset Responsibilities

- Obtaining and analyzing cellular communication data
- Historical CDR analysis and geospatial mapping
- Tower dump analysis and comparisons to establish links between significant locations/persons and cellular tower data
- Drive tests aid in verifying and measuring the actual coverage area of a cell tower
- Target Acquisition through the analysis of CDRs facilitates the deployment of a Wireless Identification and Direction-finding Team (WIDT)
- Expert Witness Testimony in support of cellular analysis

CAST Intake Form



CAST Intake Form

* Required

INTAKE FORM

Requester Information

First Name *

Your answer

Last Name *

Your answer

Desk Phone *

Your answer

Cell Phone

Your answer

To request CAST assistance with a case, email CAST@fbi.gov and request the CAST Intake Form.

Fill out the form, and a CAST agent will be in touch with you.

US Codes & Orders

- **Title 18, United States Code § 2510 (15) -** Definition of electronic communication provider
- **Title 18, United States Code § 2701 -** Electronic Communication Privacy Act (ECPA)
- **Title 18, United States Code § 2702(c) -** Voluntary disclosure by provider of information/records pursuant to an exigent request
- **Title 18, United States Code § 3125 -** Emergency pen register and trap and trace installation
- **Title 18, United States Code § 3127 -** Defines electronic communications, pen registers, wire communication, electronic communication, electronic communication service, and contents
- **28 CFR Part 16 Subpart B -** Production or disclosure in federal or state proceedings regarding law enforcement information
- **Court Orders/Search Warrants**
  - Court order 2703(d) or search warrant for historical call detail and cell site. Refer to the AUSA for the most current court requirement.
  - Court order 2703(d) & 3123 hybrid order for pen register to also get historical records may require a search warrant
- **Policies**
  - The best policy is to discuss with your local AUSA and determine what method (2703(d) or search warrant) should be pursued in order to acquire the records from the cell phone company.

General Record Request Requirements

Varies by Judicial District

CELLULAR ANALYSIS SURVEY TEAM

Subpoena

- Toll Records (no cell sites)
- Call to Destination search
- Subscriber information
- Payment Information (i.e. how payment is made)
- ESN (electronic serial number)/IP Addresses
- How long the subscriber has had the service and phone equipment

Court Order or Search Warrant

- Historical Tower Information to include cell site and sector
- Text Messaging /Text Content
- Data Connections
- Installation of Pen Trap & Trace
- Tracking authorization
- Subscribers for all numbers contacting target
- Location Based Services
- Ping data (Sprint)
- E-911 (T-Mobile & AT&T)
- *Plus: Anything you can get with a Subpoena alone*

Language for Historical CDRs with Cell Site and Additional Reports (Carrier Specific)

Last Update 08/24/2018

Recommend at least 60 days worth of records in order to establish a pattern analysis. See below for suggested language to obtain this time frame

VERIZON:

Provide Call Detail Records (CDRs) for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:
All subscriber information, including name, address, contact numbers, activation/deactivation dates, account number, social security number, and account features

1. All device identifiers, to include ESN, MEID, IMEI, and IMSI
2. Cell site locations and sectors for all outgoing and incoming voice, SMS, MMS, and Data transactions.
3. All available RTT reports, to include 1X, EVDO, LTE, and data.
4. IP Session and IP Source-Destination reports
5. All text message content to include pictures OR provide the Cloud account which stores this content. (**Requires Search Warrant**)
6. Device identifiers, such as IMEI, for all devices (watches, HUM, tablets, etc.) that are connected/paired to this number/subscriber acct.

Voicemail retrieval is available (requires order to be a Search Warrant). A request must be made for Verizon to reset the Subscriber's password, then the investigator can access the Subscriber's voicemail. ***CAVEAT: THE SUBSCRIBER WILL KNOW THE PASSWORD HAS BEEN RESET***

SPRINT:

Provide Call Detail Records (CDRs) for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:

1. All subscriber info, including name, address, contact numbers, activation/deactivation dates, account number, SSN and account features
2. Cell site locations and sectors for all outgoing and incoming voice, SMS, MMS, and Data transactions.
3. All available PCMD reports, to include LTE, EVDO, IP session and data.
4. All available voicemails (**Requires Search Warrant**)

Language for Historical CDR's with Cell Site and Additional Reports (Carrier Specific)

Last Update 08/24/2018

AT&T:

Provide Call Detail Records (CDRs) for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:

1. All subscriber information, including name, address, contact numbers, activation/deactivation dates, account number, social security number, and account features
2. Cell site locations and sectors for all outgoing and incoming voice, SMS, MMS, and Data transactions.
3. All available historical precision location (NELOS) reports
4. All available Internet and Web Browsing History, to include history with and without location information.
5. All twinned/paired devices associated with the account

T-MOBILE:

Provide Call Detail Records (CDRs)/Mediations Report for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:

1. All subscriber information, including name, address, contact numbers, activation/deactivation dates, account number, social security number, and account features
2. Cell site locations and sectors for all outgoing and incoming voice, SMS, MMS, and Data transactions.
3. All available Timing Advance Reports, currently known as True Call, to include cell site, sector, and distance from tower, IP session and Data. Note: Obtaining True Call requires a phone call to T-Mobile specifically requesting it after legal demand is served. This is a new report that only a few compliance personnel can access. Currently, only CAST can request this record.
4. All available Mobile Data Session and IPv6 reports.
5. All available voicemails (**requires order to be a Search Warrant**)

Language for Historical CDR's with Cell Site and Additional Reports (Carrier Specific)

Last Update 08/24/2018

US CELLULAR:

Provide Call Detail Records (CDRs) for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:

1. All subscriber information, including name, address, contact numbers, activation/deactivation dates, account number, social security number, and account features
2. Cell site locations and sectors for all outgoing and incoming voice, SMS, MMS, and Data transactions.
3. All available PCMD reports, to include LTE, IP session, and Data.
4. All text message content to include pictures OR provide the Cloud account which stores this content (**Requires a Search Warrant**).
5. All available Payment History and Account Memos.
6. All available True Call records.

NTELOS (soon to be Sprint):

Provide Call Detail Records (CDRs) for XXX-XXX-XXXX, for the time period XXXX – XXXXX, to include:

1. All subscriber information, including name, address, contact numbers, activation/deactivation dates, account number, social security number, and account features
2. Cell Site locations and Sectors for ALL outgoing and incoming Voice, SMS, MMS and Data transactions.
3. ALL available True Call Reports, to include cell site, sector, and distance from tower, IP session and Data.

Suggested Verbiage for obtaining 60 days of records:

"Your affiant has received advice from Federal Bureau of Investigation Special Agent David Church during this investigation. Special Agent Church routinely works with phone record analysis as part of his employment. Special Agent Church informed your affiant that it is often beneficial to review at least 60 days of records as they relate to call detail records. Your affiant believes that this range of records will establish a pattern of life and behavior. A smaller collection of records would make it difficult to determine if it is unusual for the phone(s) to appear in the areas where these crime(s) occurred. Not only will this assist in determining if the phone(s) frequents the areas of the crime scene(s), but also whether the phone normally belongs in these areas because that is where the phone subscriber lives and/or works."

Tower Dumps

"Provide all incoming and outgoing communications (Voice, Text, and Data) from all towers and sectors that provide service to the following location(s):

123 Bad Guy Street, Anywhere, VA, ZIP"

Introduction to Basic Cellular Theory
Cell Towers

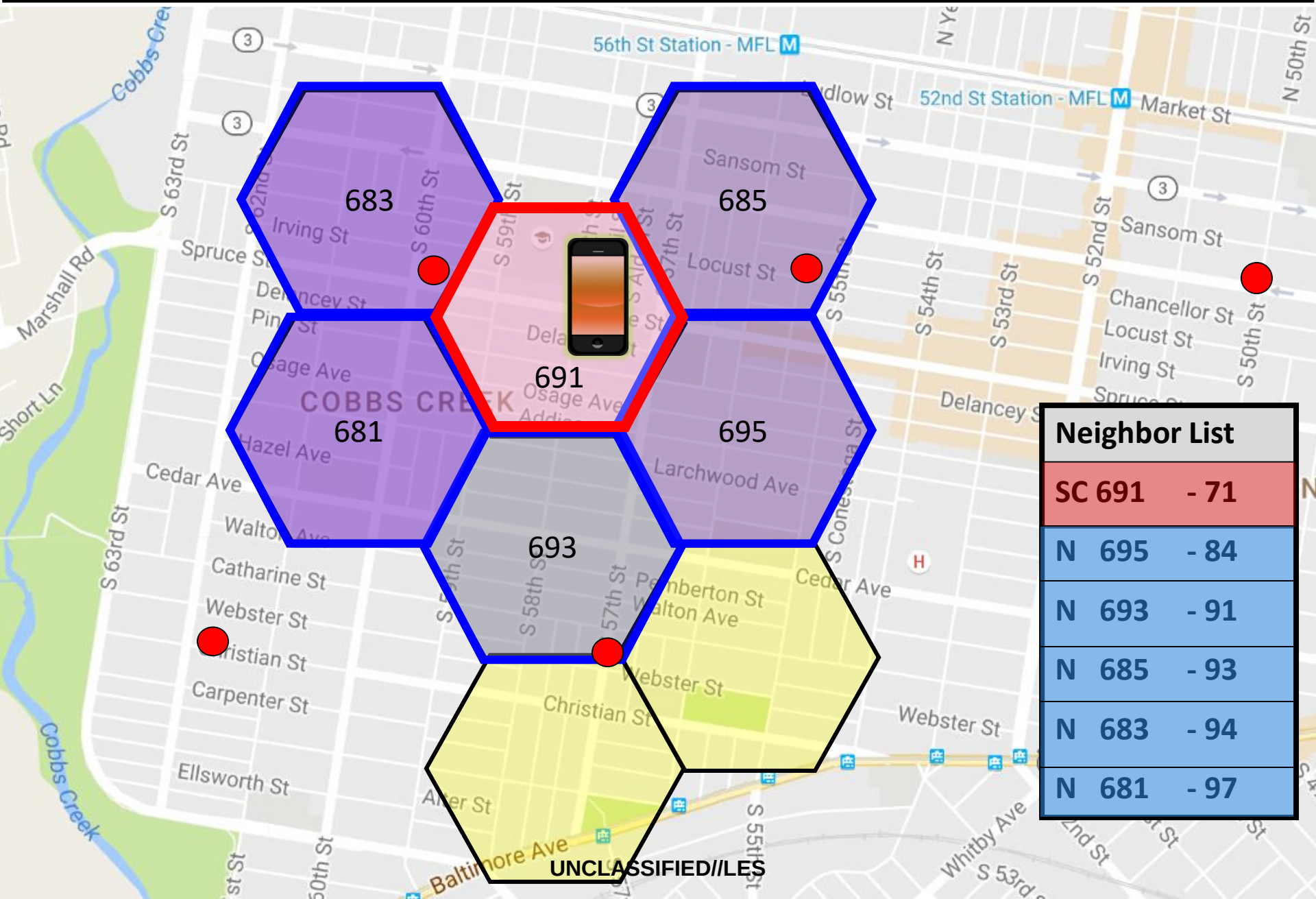
Examples of cell towers disguised to blend into the landscape

Base Stations (Cell Towers)

- Networks provide service through cell towers known as base stations (BS).
- Each BS has a Global Cell ID (GCI/eCGI). The GCI/eCGI is unique on the network and not duplicated (like a fingerprint).
- The Country Code is always 310 for USA, the Network Code is specific to the provider.
- The LAC/Switch and Cell Site ID (CID) are obtained from the tower lists. For all carriers, with the exception of Verizon, the CID is comprised of the tower and sector.

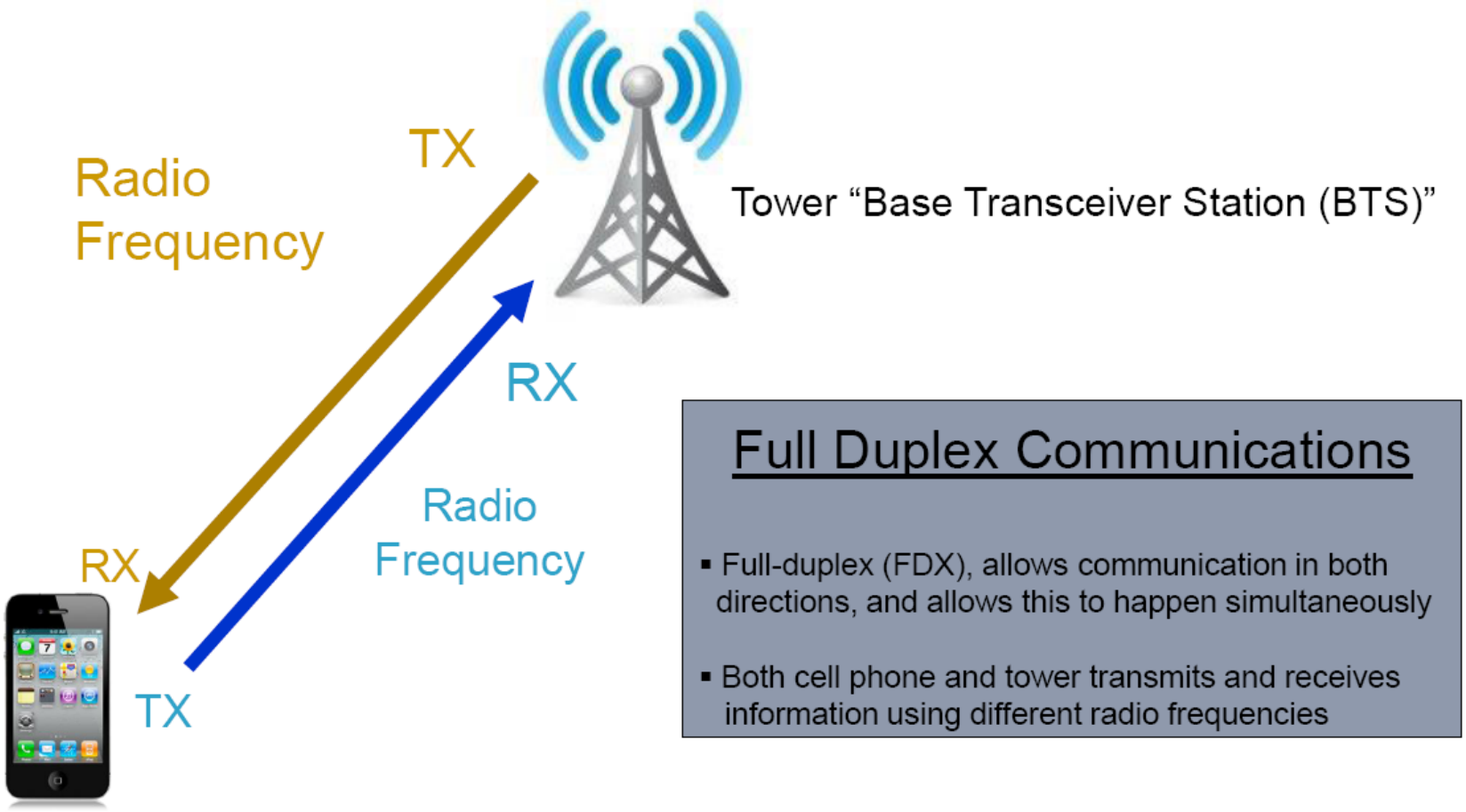
	Technology Type	3G and Prior Technologies Switch and Tower Identifiers	4G LTE Network Switch and Tower Identifiers
AT&T	GSM (2.5G) not in all markets UMTS (3G) LTE (4G)	Location Area Code (LAC) + Cell Site ID (CID)	Cell location (eCGI + eNodeB)
T-Mobile	GSM (2.5G) UMTS (3G) LTE (4G)	LAC + CID	LTE Site ID + LTE Sector ID
Sprint	CDMA (2G/3G) LTE (4G)	NEID + Cell	Specific VOLTE records are not currently provided. May see VOLTE mixed in some 3G records.
Verizon	CDMA (2G/3G) LTE (4G)	Network Element Name + Serving Cell Site + Serving Cell Face	eNB ID + Cell Face
U.S. Cellular	CDMA (2G/3G) LTE (4G)	Switch + CLLI	ENODEB (includes the country code – ENB – Sector)

A cellular phone is regularly surveying the Radio Frequency (RF) environment of the cellular provider to identify the cell tower and sector with the BEST RF Signal.



Neighbor List	
SC 691	- 71
N 695	- 84
N 693	- 91
N 685	- 93
N 683	- 94
N 681	- 97

Tower and Cell Phone Communication



Full Duplex Communications

- Full-duplex (FDX), allows communication in both directions, and allows this to happen simultaneously
- Both cell phone and tower transmits and receives information using different radio frequencies

When a cell phone connects to a tower to conduct an outgoing call or receive an incoming call, the phone company (provider) maintains a record of that EVENT in the Call Detail Records.

Historical Cell Site Analysis

Cellular Analysis Tips

(Once case or exigent circumstance is established)

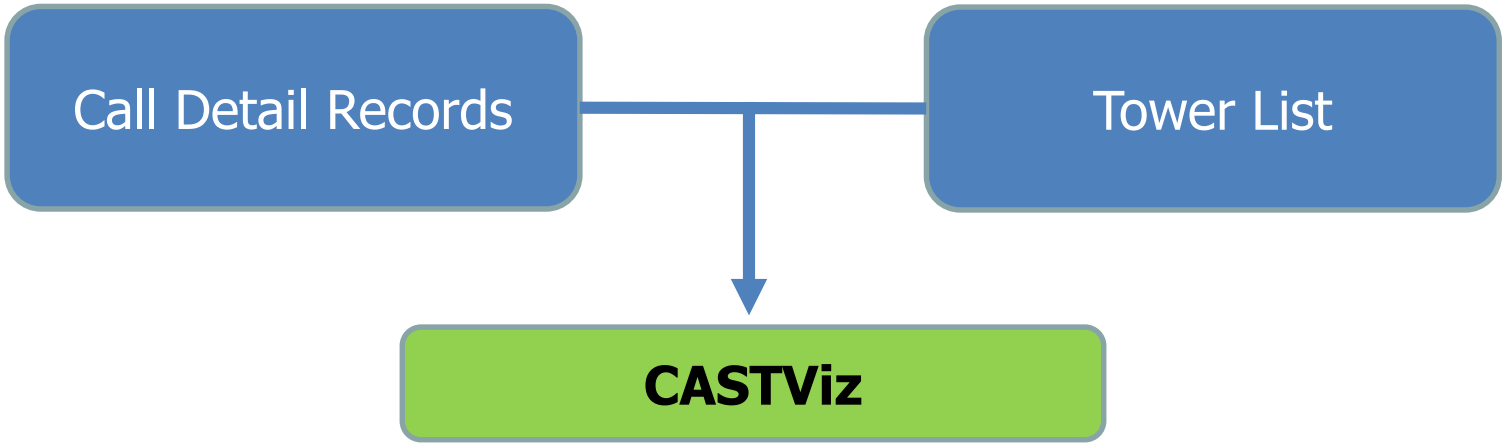
1. Determine the phone company and portability issues of the target phone.
2. What services does the company offer?
3. Are Location Based Services (LBS), Triangulation, GPS/Ping, PCMD, True Call, or Timing Advance available?
4. Obtain necessary legal process.
5. Use mapping program to map relevant locations and cell towers. Review the records in Excel or other tools to verify you received what you requested (date, phone, and that you received cell phone records with tower information).
6. Look for last call at night, first call in the morning, as well as the most frequently used cell sites and most frequently called phone numbers.
7. Determine the cell sector pertinent to your investigation.
8. Look for other involved subscribers (called or calling) that are in the same geographical location for possible leads.
10. Review additional case information for leads in the area.

5 Steps For Success

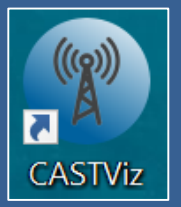
1. Set up tower list by combining 4 columns (If using CASTViz, load original, non-altered record)
   - LAC/Switch/Repoll/Network Element Name
   - CID/Cell Number
   - Sector
   - Azimuth/Orientation
2. Import tower list into a mapping program
3. Plot addresses from crime
4. Filter Call Detail Record (CDR) by date and identify the tower(s) utilized during the date and time of the crime.
5. On your map, locate the tower/sector used during date and time of the crime and draw the sector coverage area based on the azimuth/orientation.

Basic Historical Cell Site Analysis

- What do we need?
  - Date/Time of the Crime
  - Location of the Crime Scene
  - Call Detail Records (subject's phone records)
  - Tower List for the Cellular Service Provider
- How do we illustrate that on a map?

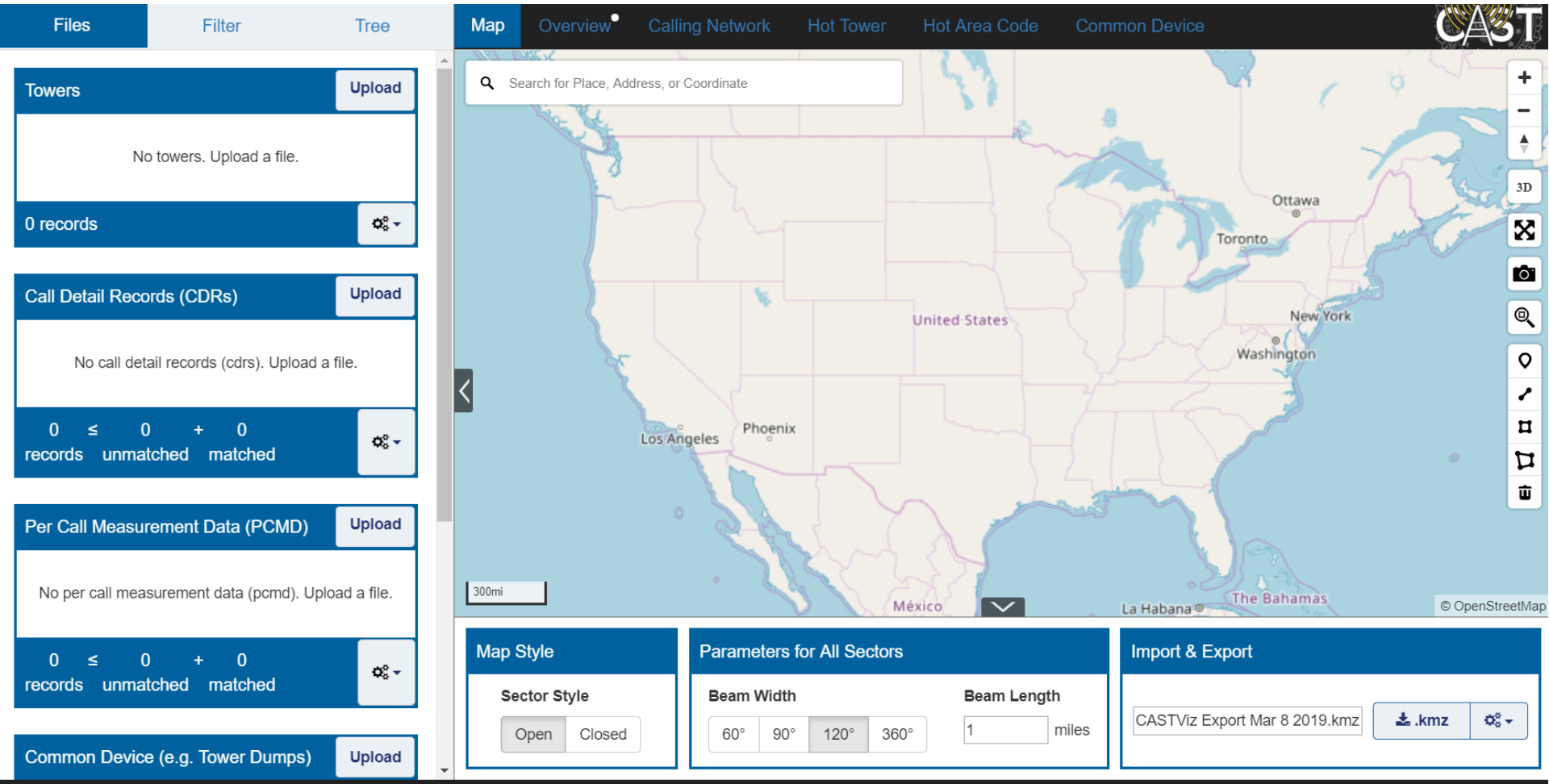


CASTViz Overview



- CASTViz was created by the CAST team in conjunction with other government agencies that perform mapping analysis.
- CASTViz is available free to law enforcement personnel, and is located at: https://ndcac.fbi.gov/le-portal
- The program can be downloaded to any official computer.
- Maps and analysis created by CASTViz should not be taken to court without being validated for accuracy. Testimony should only be through a qualified expert.
- CASTViz has the ability to quickly plot call detail records and tower data for lead generation and investigative purposes.
- Once you download CASTViz, open the program and click on the "help" at the bottom right to access the CASTViz guide. Please review this guide before contacting CASTViz@fbi.gov with questions.

CASTViz



cast@fbi.gov

This tool was developed by the FBI's Cellular Analysis Survey Team (CAST). All results should be verified. CAST provides analysis, consultation, drive testing, and expert testimony in regards to cellular communications in all types of cases.

help

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Call Detail Records (CDR)

Historical CDR -

A data record of a particular mobile device's activity over time

Network Element Name	Mobile Directory Number	Dialed Digit Number	Call Direction	Seizure Dt Tm	Seizure Duration	First Serving Cell Site	First Serving Cell Face	Last Serving Cell Site	Last Serving Cell Face	Calling Party Number
Azusa53	626261	818854	0	12/25/2012 11:05	28	374	3	374	3	62652
LosAngelesGateway	626261	62626	F	12/25/2012 11:05	33	0	0	0	0	62652
Azusa53	626261	818854	0	12/25/2012 11:06	26	374	3	374	3	62652
Azusa53	626261	818854	0	12/25/2012 11:06	26	374	3	374	3	62652
LosAngelesGateway	626261	62626	F	12/25/2012 11:06	33	0	0	0	0	62652
LosAngelesGateway	626261	62626	F	12/25/2012 11:06	10	0	0	0	0	62631
LosAngelesGateway	626261	62626	F	12/25/2012 11:06	32	0	0	0	0	62652
Azusa53	626261	818854	0	12/25/2012 11:07	42	72	3	72	3	62652
LosAngelesGateway	626261	62626	F	12/25/2012 11:07	48	0	0	0	0	62652
Azusa53	626261	818854	0	12/25/2012 11:08	26	72	3	72	3	62652
Azusa53	626261	818854	0	12/25/2012 11:08	27	72	3	72	3	62652
LosAngelesGateway	626261	62626	F	12/25/2012 11:08	31	0	0	0	0	62652
Marina_Pkt_Gtwy	626261	62626	F	12/25/2012 11:08	32	0	0	0	0	62652
Azusa53	626261	818854	0	12/25/2012 11:10	26	72	2	72	2	62631
LosAngelesGateway	626261	62626	F	12/25/2012 11:10	33	0	0	0	0	62631
Azusa53	626261	62626	F	12/25/2012 11:12	36	0	0	0	0	90945
Azusa53	626261	62626	F	12/25/2012 11:13	41	0	0	0	0	90945
LosAngelesGateway	626261	1120000	00	5	12/25/2012 11:13	3	0	0	0	0	90945
Azusa53	626261	62626	2	12/25/2012 11:14	79	72	3	72	3	90945
Marina_Pkt_Gtwy	626261	1120000	00	5	12/25/2012 11:14	2	0	0	0	0	90945
Azusa53	626261	909455	2	12/25/2012 11:17	28	72	3	72	3	62626
Azusa53	626261	626310	1	12/25/2012 11:20	29	368	3	368	3	62626
Azusa53	626261	818854	0	12/25/2012 11:28	28	374	2	368	3	62620
Marina_Pkt_Gtwy	626261	62626	F	12/25/2012 11:28	33	0	0	0	0	62620
Azusa53	626261	818854	0	12/25/2012 11:39	29	368	3	368	3	62620
Marina_Pkt_Gtwy	626261	62626	F	12/25/2012 11:39	34	0	0	0	0	62620

Sample Historical Cell Site Analysis

On **October 8, 2017**, at approximately **5:00 a.m.,** the victim was stabbed multiple times by the suspect. The crime occurred at **3597 Cable Pl, Pittsburgh, PA**.

CDR

CALLING_NBR	CALLED_NBR	DIALED_DIGITS	MOBILE ROLE	START_DATE	END_DATE	DURATION (SEC)	Call Type	NEID	1ST	CELL	LAST CELL
(248) 697-	(412) 685-	(1412) 685-	Outbound	10/08/2017 04:51:40	10/08/2017 04:52:49	69	Voice	172	2	611	20611
(248) 697-	(412) 685-	(1412) 685-	Outbound	10/08/2017 04:52:59	10/08/2017 04:54:18	79	Voice	172	2	611	20611
(248) 697-	(412) 897-	(1412) 897-	Outbound	10/08/2017 04:55:34	10/08/2017 04:55:42	8	Voice	172	2	611	20611
(248) 697-	(412) 897-	(1412) 897-	Outbound	10/08/2017 04:55:47	10/08/2017 04:55:54	7	Voice	172	2	611	20611

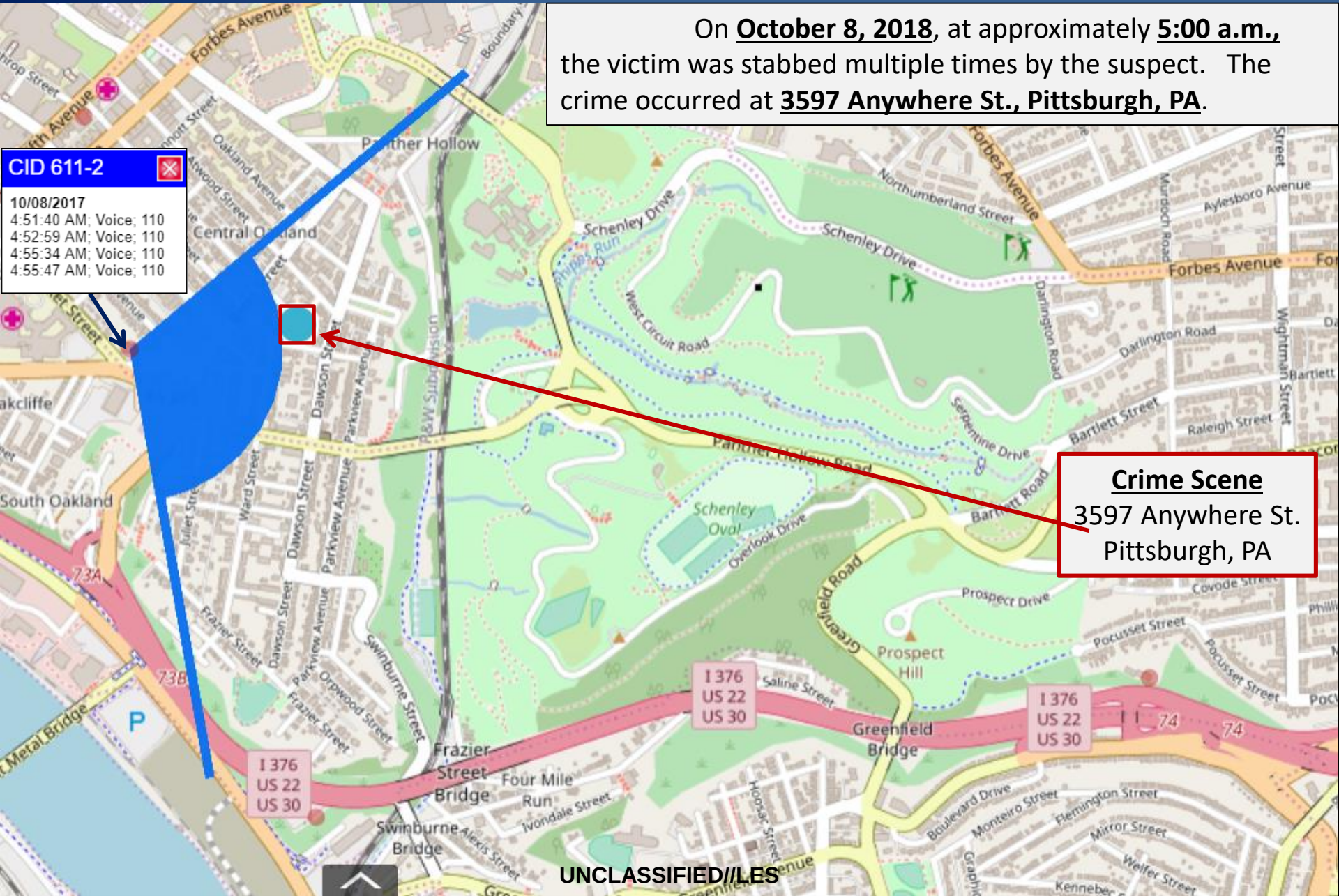
TOWERS

Cell#	Cascade ID	Switch	NEID	Latitude	Longitude	BTS Manufacturer	Sector	Azimuth	CDR Status
611	PT03XC234	BFLONYTO-MSCE-1	172	40.436278	-79.957936	Samsung	1	15	Active
611	PT03XC234	BFLONYTO-MSCE-1	172	40.436278	-79.957936	Samsung	2	110	Active
611	PT03XC234	BFLONYTO-MSCE-1	172	40.436278	-79.957936	Samsung	3	320	Active

MAPPING

Sample Historical Cell Site Analysis

On **October 8, 2018**, at approximately **5:00 a.m.,** the victim was stabbed multiple times by the suspect. The crime occurred at **3597 Anywhere St., Pittsburgh, PA**.



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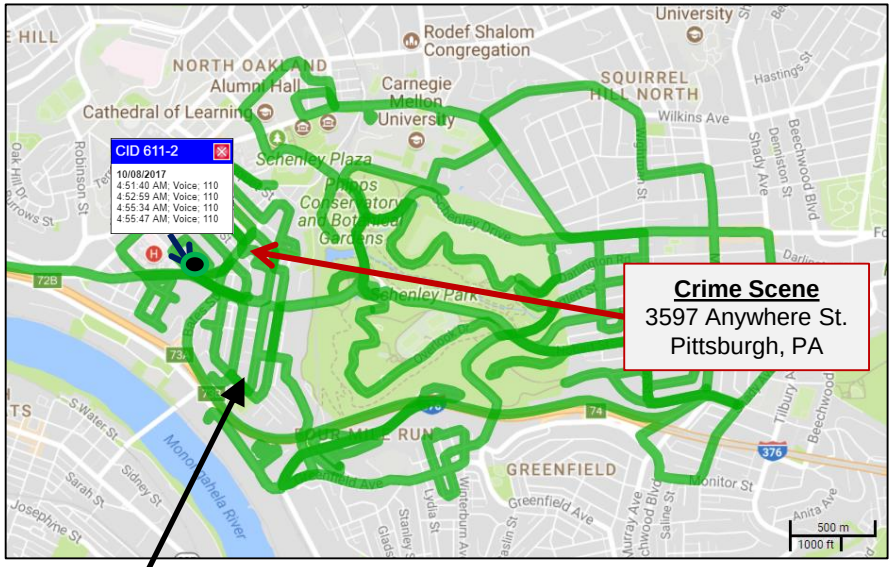
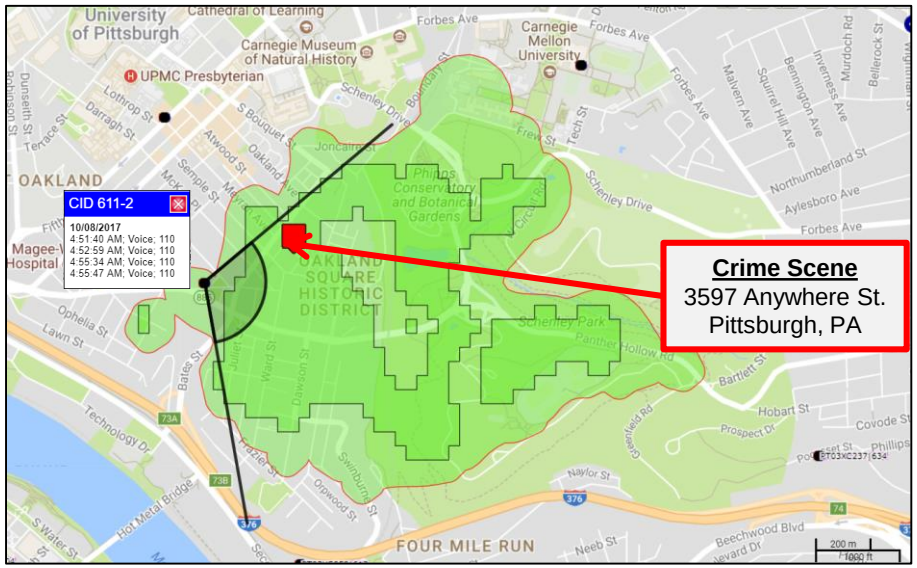
Why Do Drive Testing?

Drive testing or conducting a tower survey is the process of taking measurements from various cell towers and illustrating the radio frequency footprint.

Drive testing provides the most accurate illustration of a cell tower's footprint	The method is utilized by all major cell providers to optimize their network	The survey equipment may consist of engineering phones or a scanner



Green line indicates where the test equipment was in relation to the cell towers (black dot).

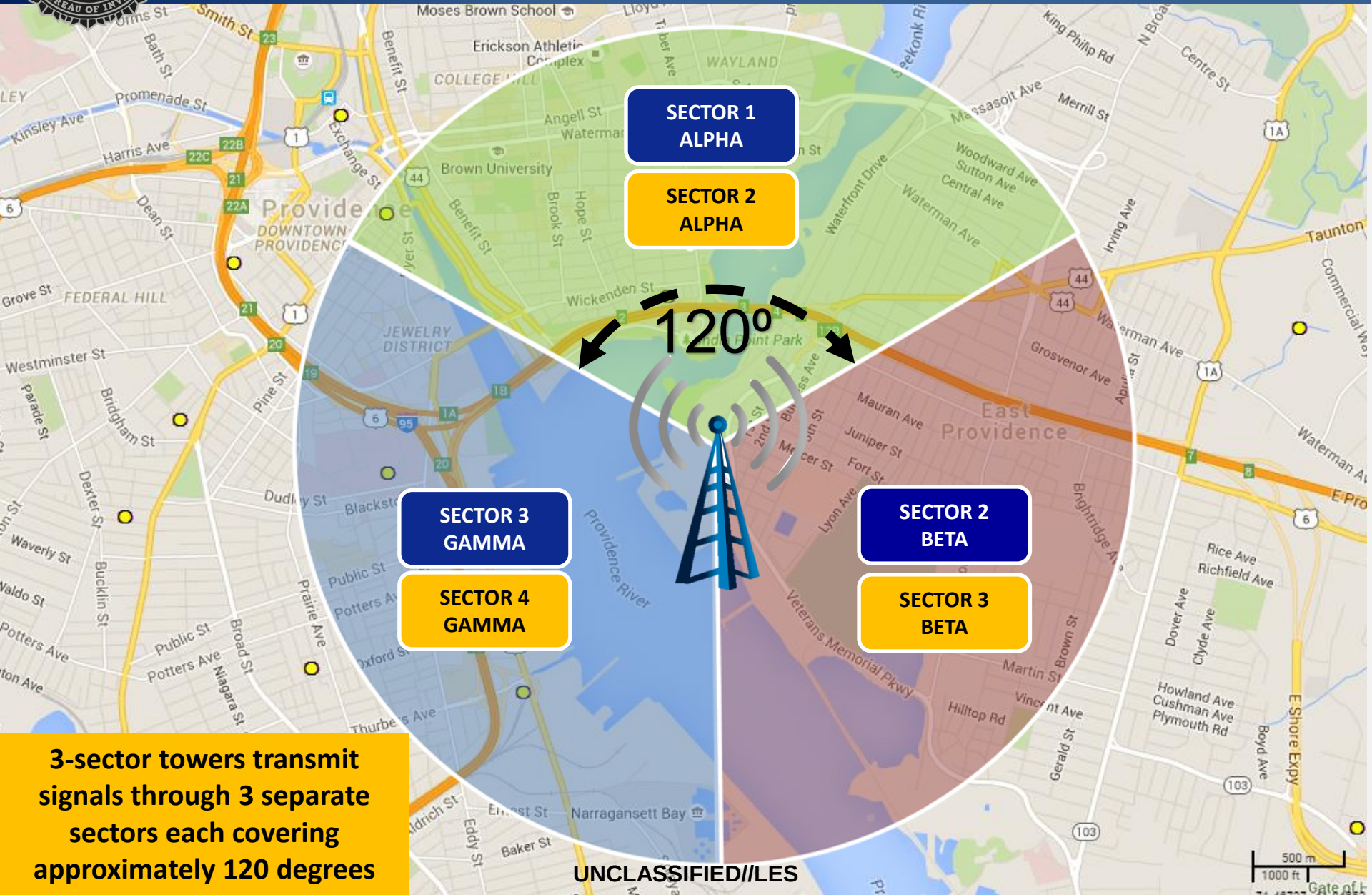


Dark shaded area indicates where the tower provides the best coverage compared to the surrounding towers.

Lighter shaded area illustrates what is commonly referred to as the overlap. The phone could have been in this area and the tower could have processed the call.

Plotting Cell Towers (Cell Sites)

Cell Tower Sectors



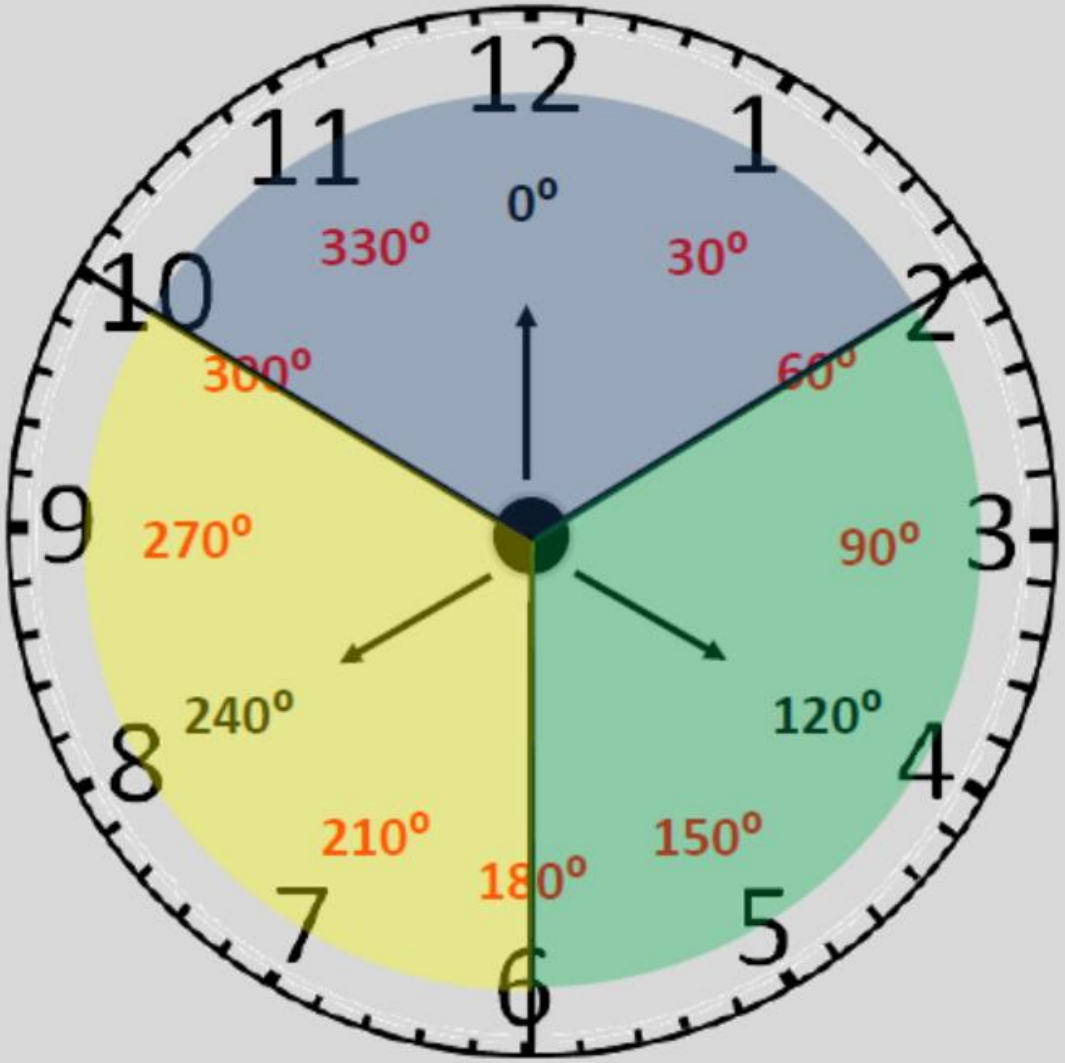
3-sector towers transmit signals through 3 separate sectors each covering approximately 120 degrees

Tower Sector Orientations

Example Only (orientation can vary by tower)

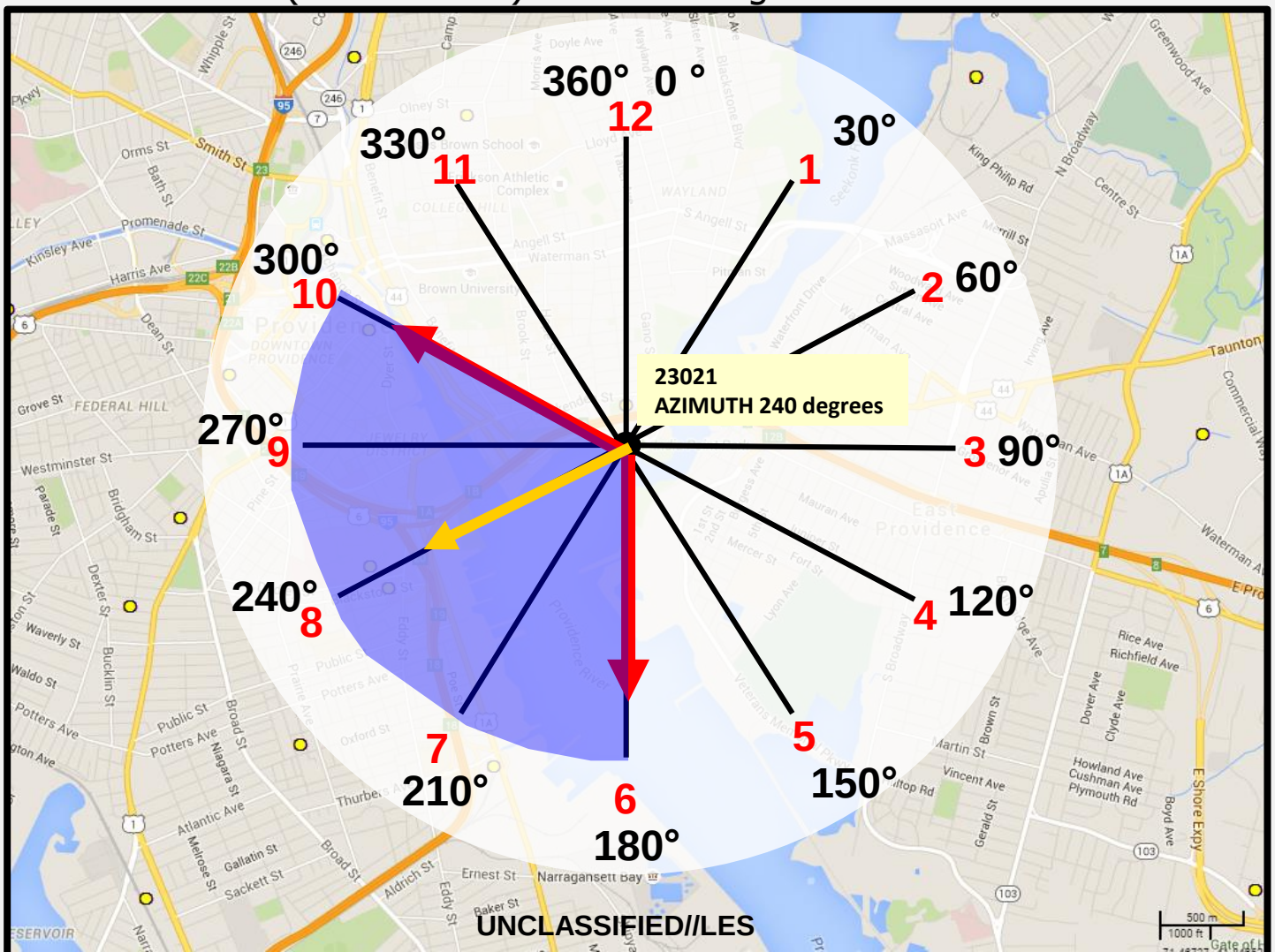
1st determine your sector and azimuth.
It is sometimes simpler to think of degrees as hours on a clock.

- Orientation (or direction) corresponds to times on a clock, with 12:00 o'clock being North
- Every hour on the clock is equal to 30 degrees
- If the orientation points at 0 degrees or 12:00 o'clock, the coverage can be approximated to be 60 degrees in either direction
- Likewise, for the remaining sectors



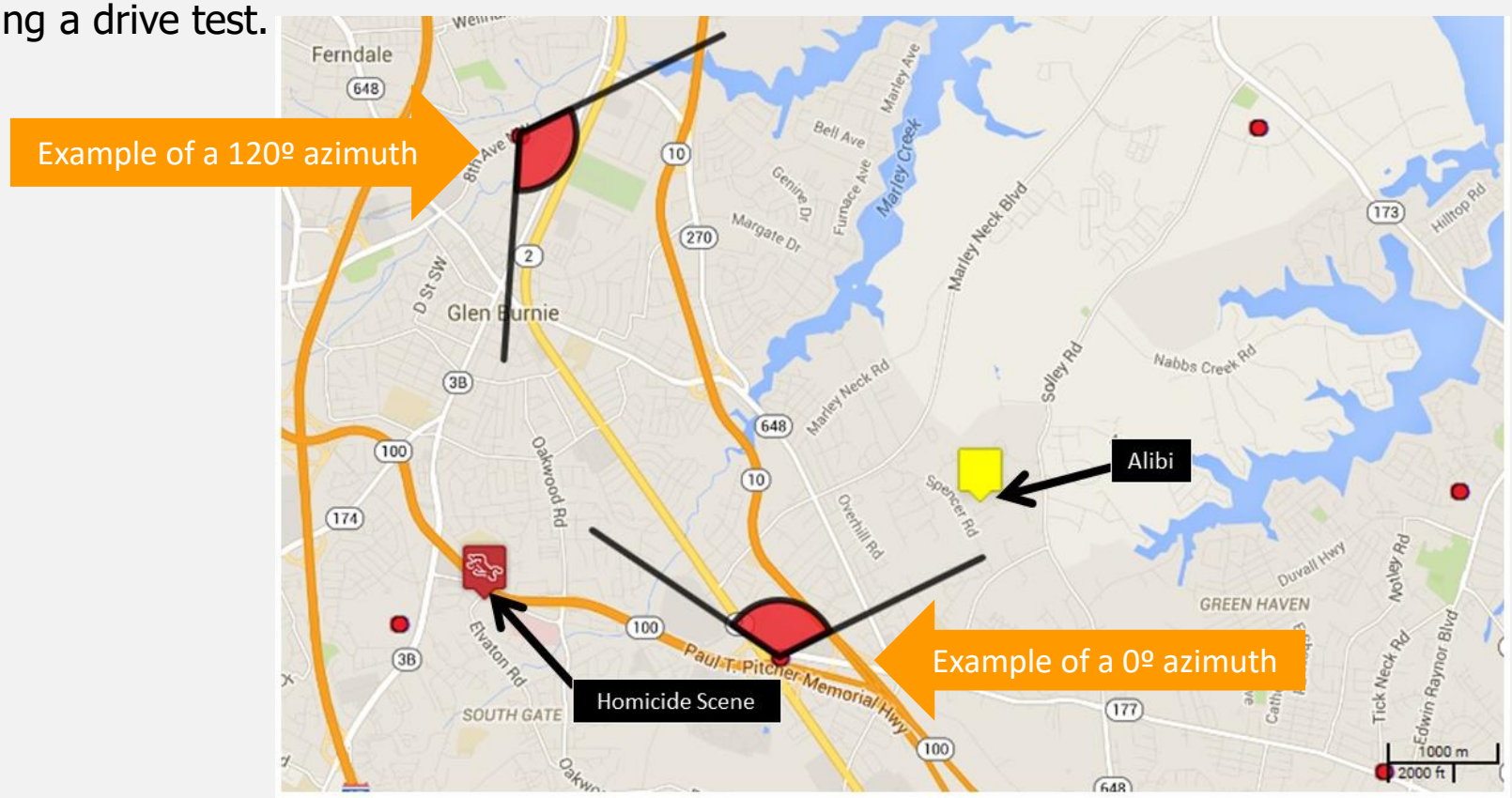
Plotting Cell Towers

This can be translated on to a map by using the same concept. Determine the cell site and corresponding sector. In the example below the sector is 240°. The area 60° in either direction (or two hours) is the coverage area.



Plotting Cell Towers

Determine the proper azimuth/orientation, and draw the sector depicting the azimuth in the center. A traditional 3-sided tower will have a sector width of 120°. The sector's estimated range is based primarily on the distance to the nearest neighboring tower in the direction of the azimuth. Urban areas with a higher density of towers have smaller coverage areas. As a general rule of thumb, a tower's range can be depicted as 70% of the distance to the next neighboring tower. The actual (RF) coverage can be mapped using cellular survey gear and completing a drive test.



Cell Site (Tower) Database

National Domestic Communications Assistance Center (NDCAC)

https://portal-ndcac.fbi.gov

Technical Research Group: 855-306-3222 or Askndcac@fbi.gov

General Info: 540-361-4600 or NDCAC@fbi.gov

- One-of-a-kind assistance center designed to focus on law enforcement's challenges with communication services, training, and coordination needs
- Maintains the Cell Site Database
- Portal contains the most current version of CASTViz
- Staffed to assist local agencies with pen registers, wire intercepts, data intercepts, and training …
- NDCAC is not an operational entity, it was established to assist with emerging technologies

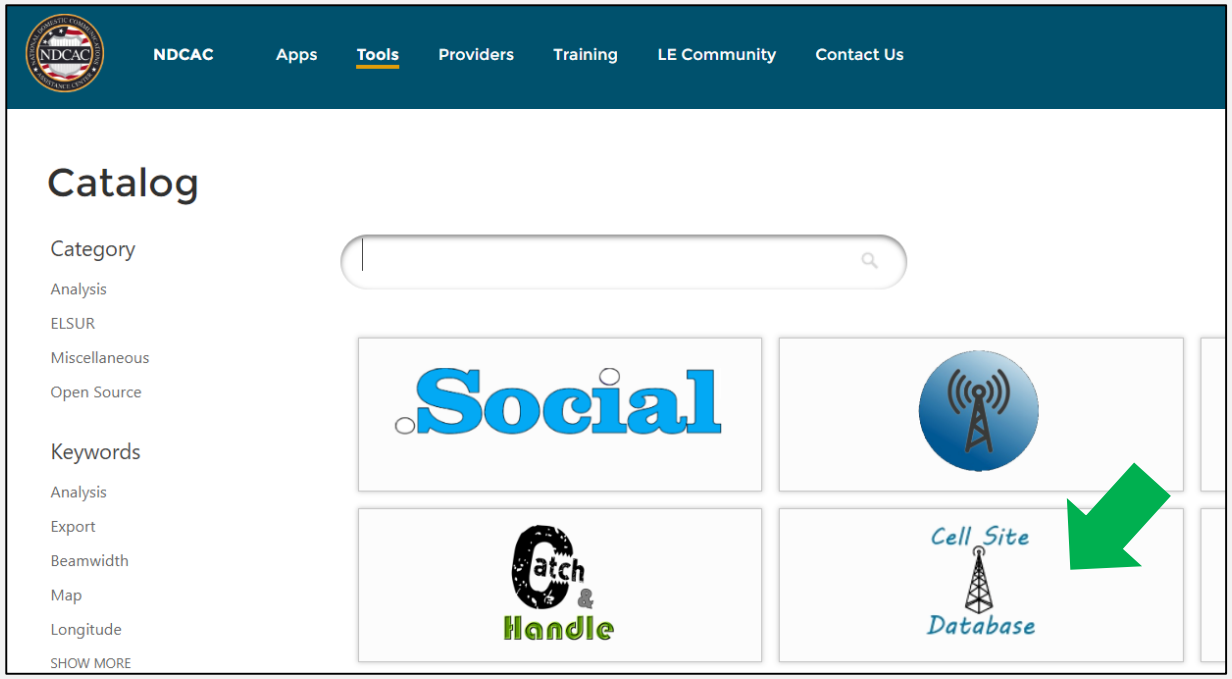
Cell Site Database

https://portal-ndcac.fbi.gov

Database of current and archived tower lists for all major (and many local) cell phone companies.

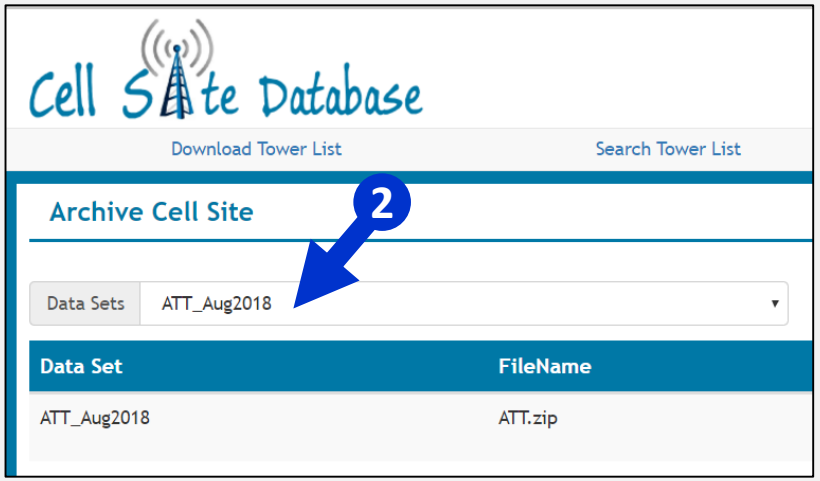
- Ability to download tower lists by month and year
- Can search for towers by specific area, timeframe, and provider
- NDCAC will add local carriers to the database as requested

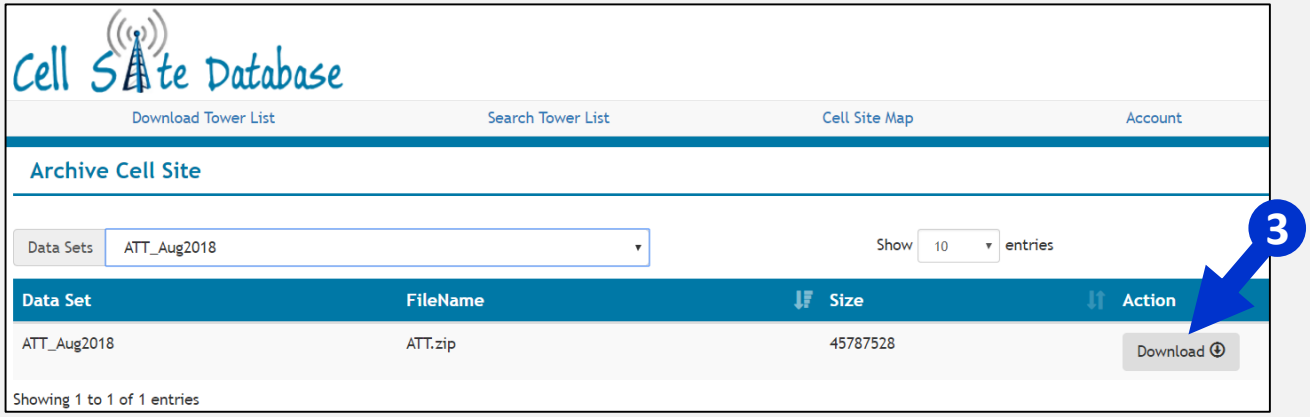
Email: askndcac@fbi.gov



Cell Site Database

1. Click on the provider's icon at the bottom of the screen
2. Choose the data set closest to the timeframe in the CDRs
3. Click Download

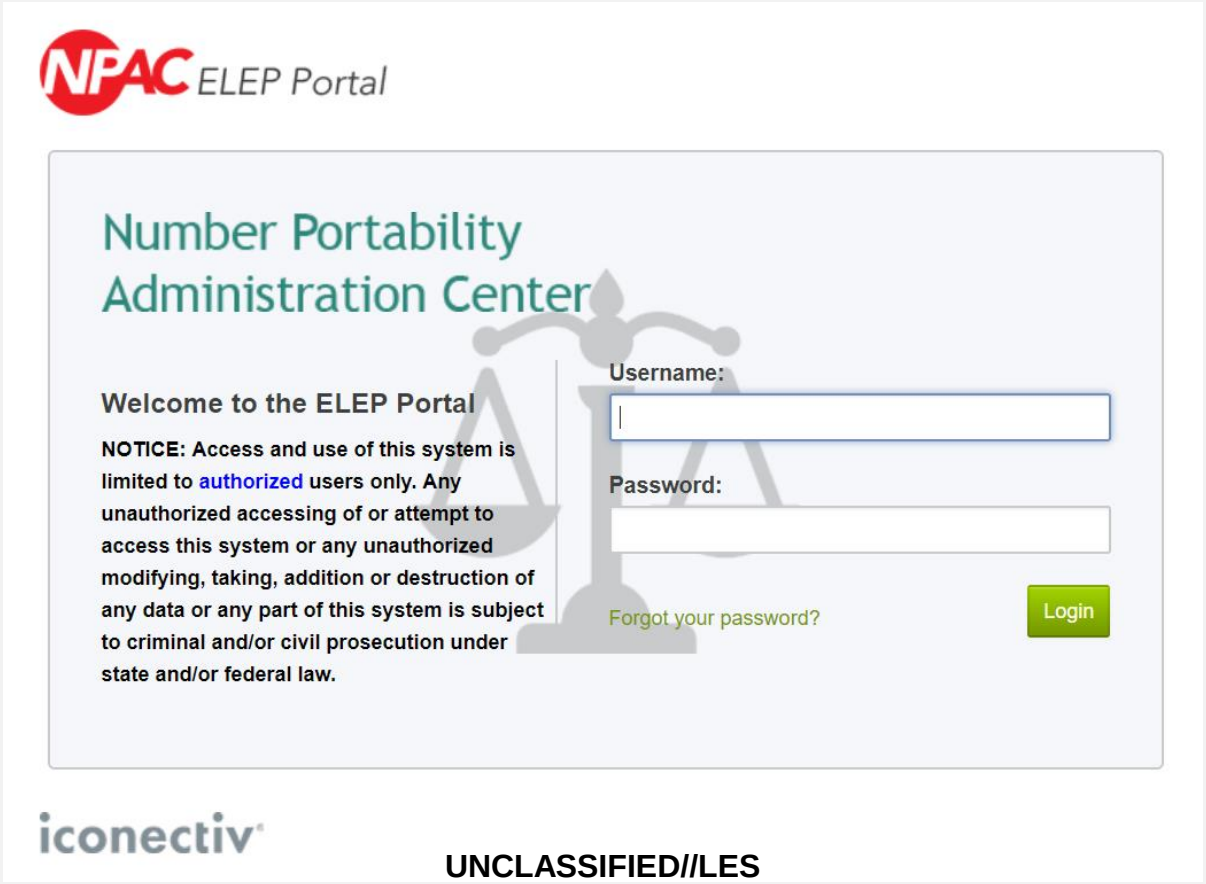




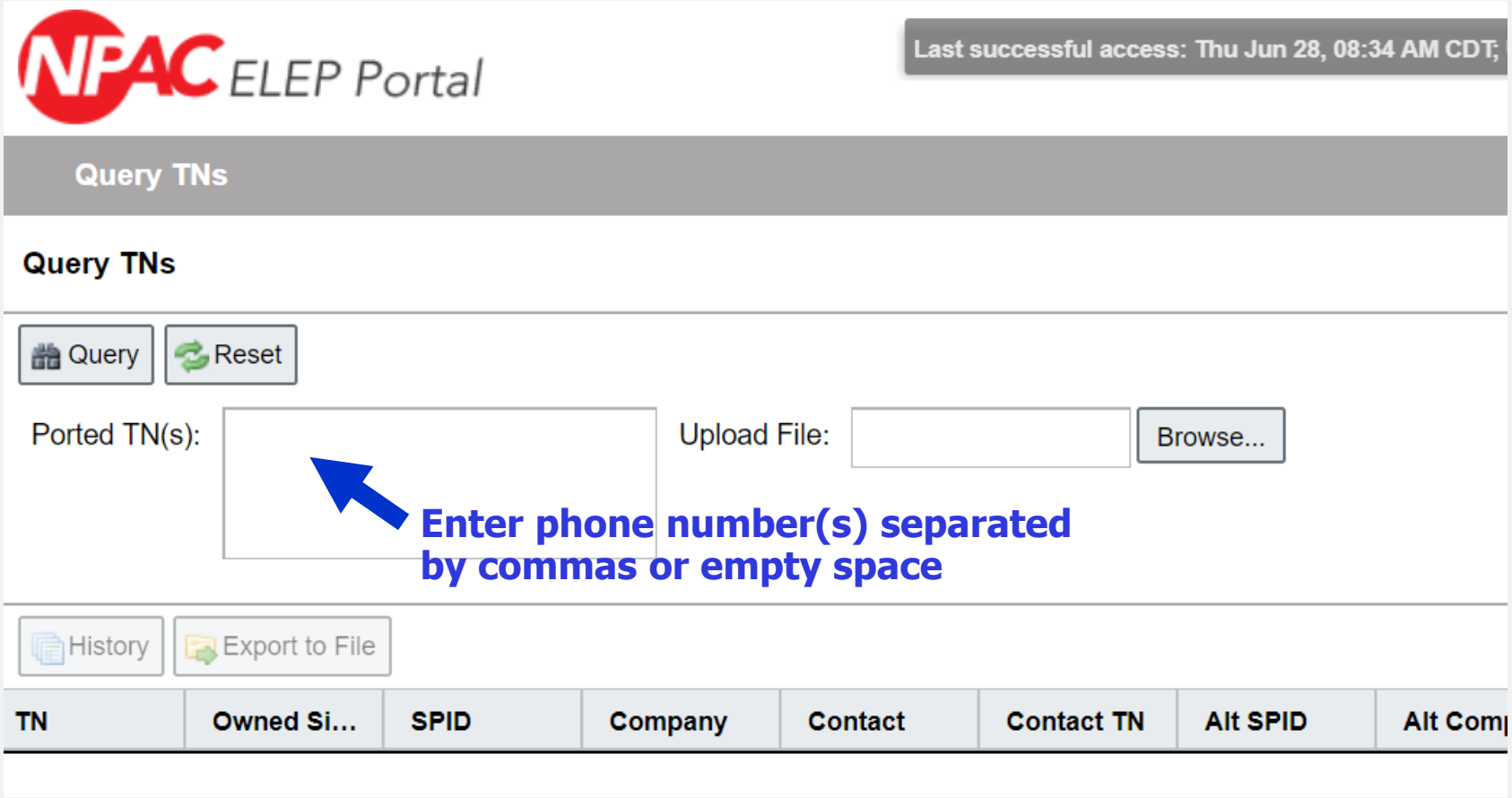
ELEP

https://elep.numberportability.com/login

- Gives LEOs information about recent telephone number porting activity
- Useful to determine carrier of record when investigating
- To sign up for access go to: https://www.numberportability.com/



ELEP



- The number(s) will come back with assigned company and contact info
- The list can be downloaded to Excel

Other Useful Resources

How to Determine Phone Service Provider / Subscriber Info

Fone Finder	www.fonefinder.net
Reverse Phone Directory	www.reversephonedirectory.com
Locate Plus	www.locateplus.com
CLEAR	https://clear.thomsonreuters.com/clear_home/index.jsp
Google	www.google.com
Accurint	www.accurint.com

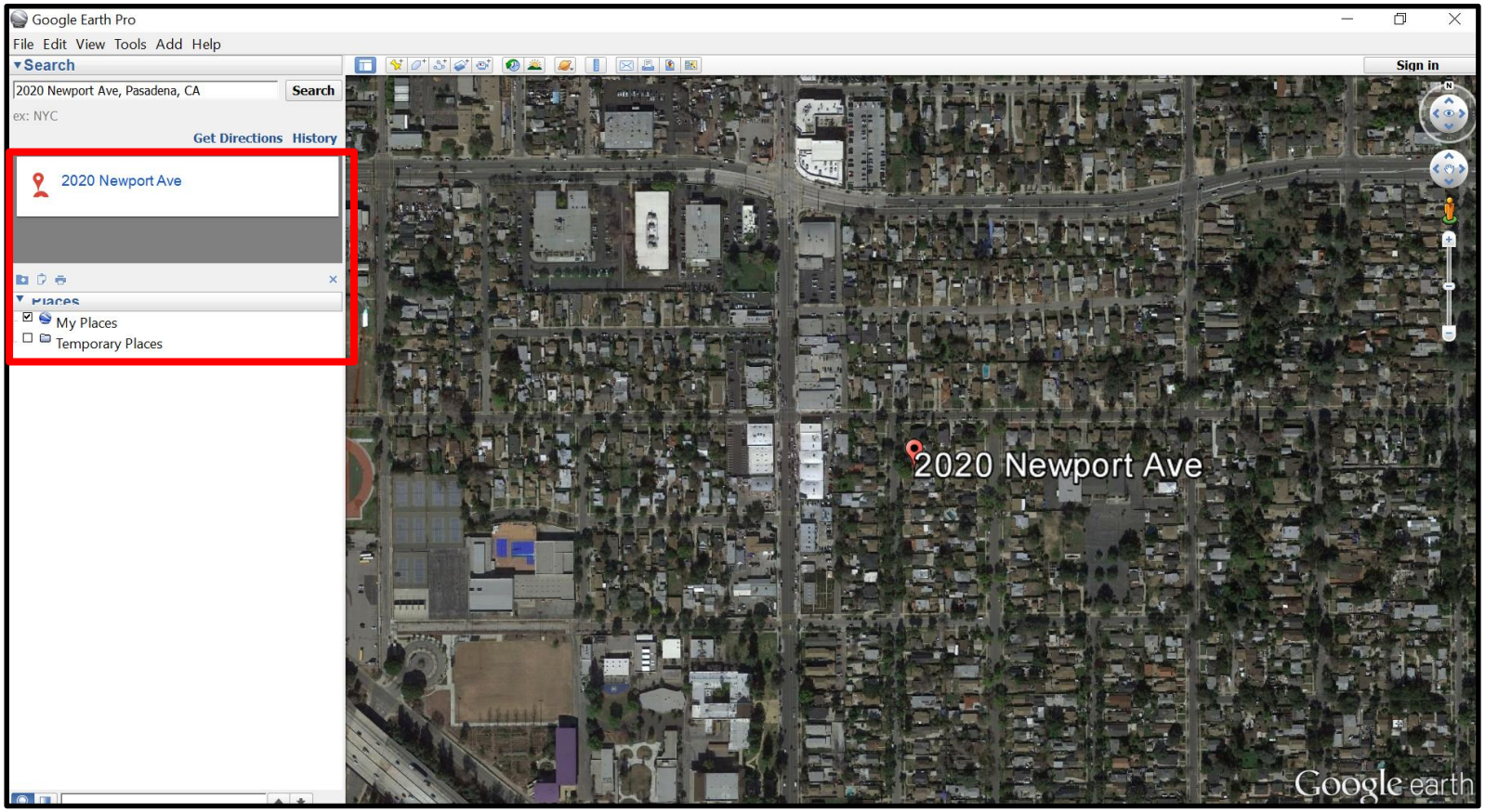
Services may require paid subscription

Mapping in Google Earth Pro

Google Earth Pro

Search for Locations

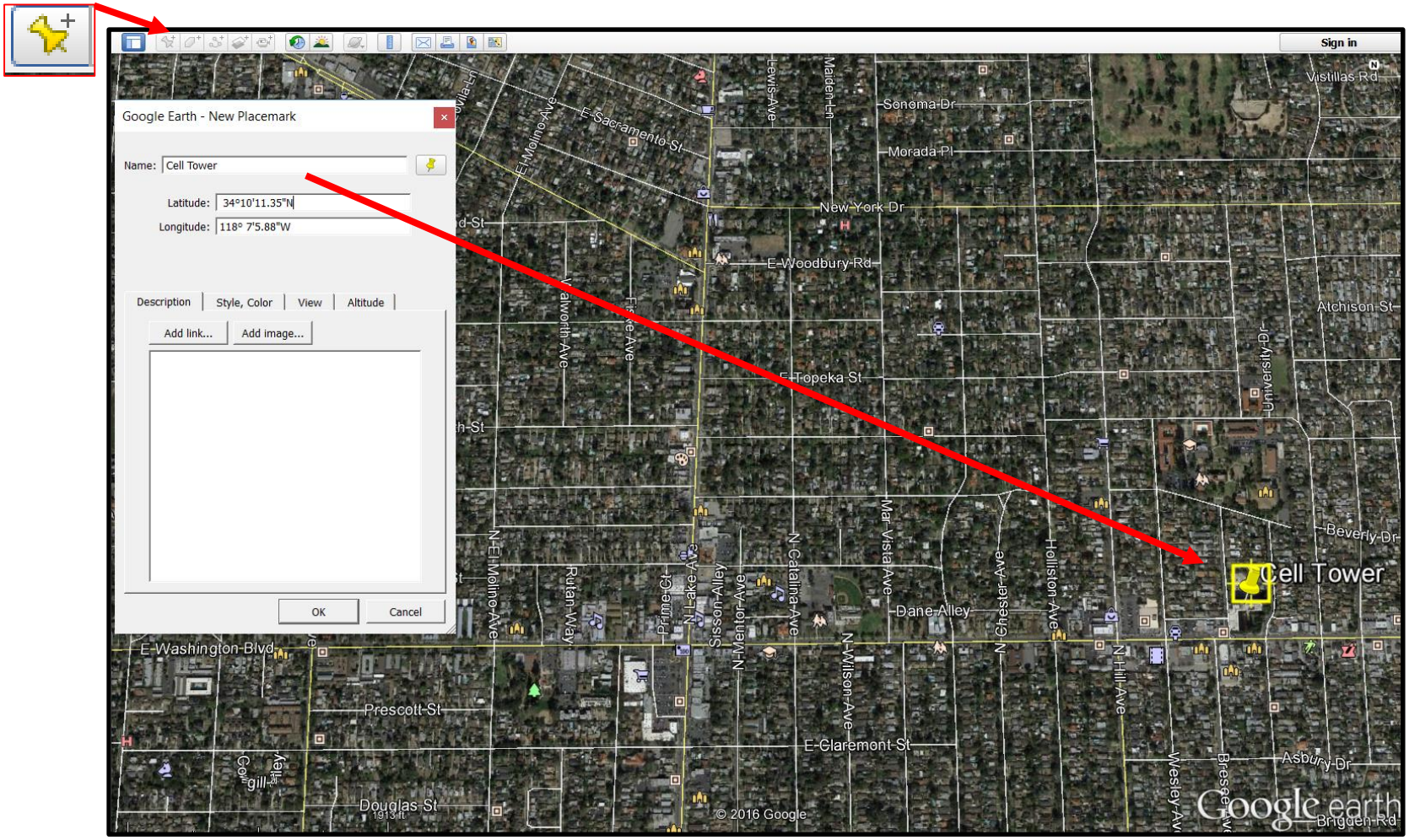
- Under the SEARCH TAB you can search for specific address or location in Google.



Google Earth Pro

Add Placemarks

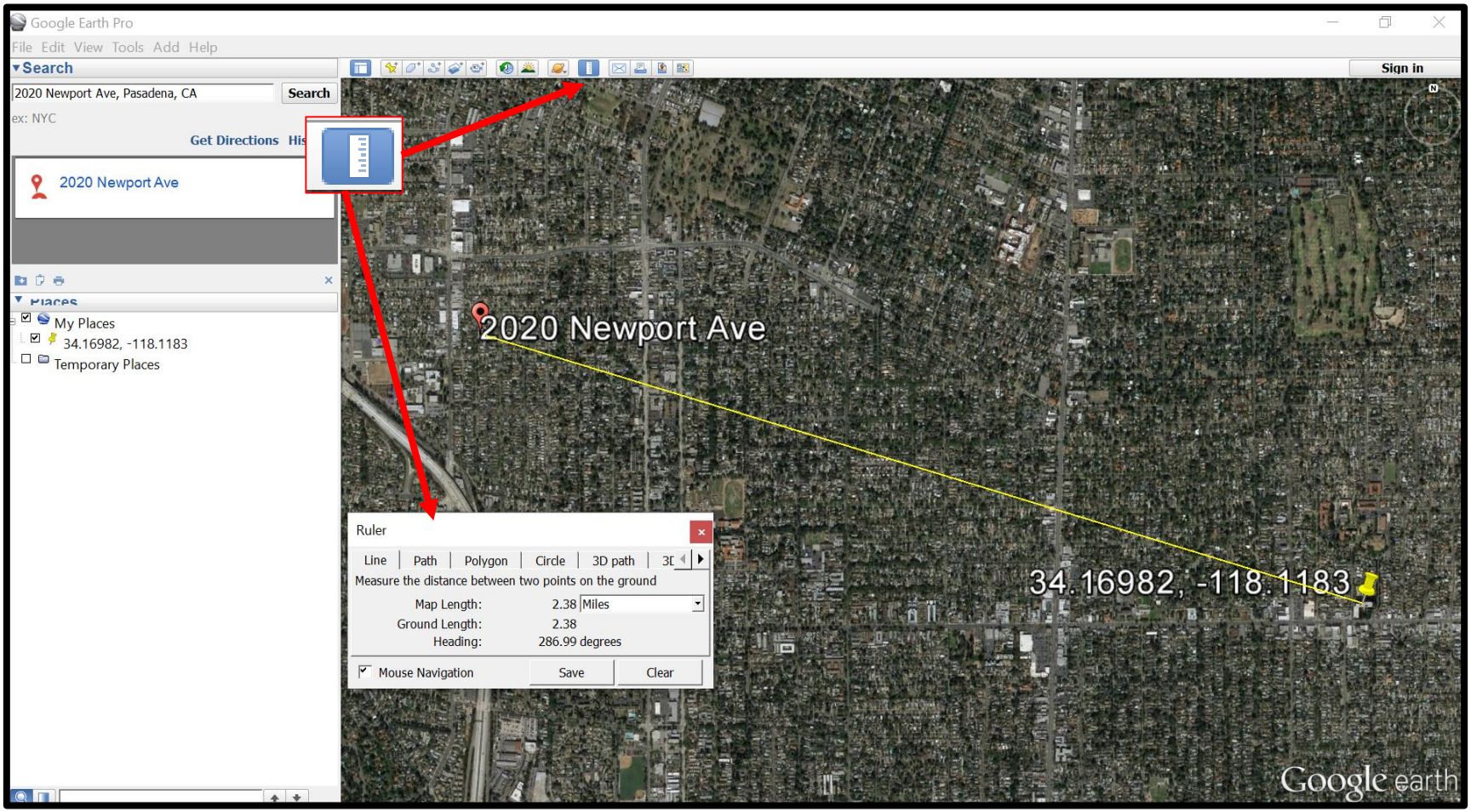
- The NEW PLACEMARK tool can be used to insert an ICON at any location on the map. The dialogue box allow you to change the ICON properties



Google Earth Pro

Determine Distance

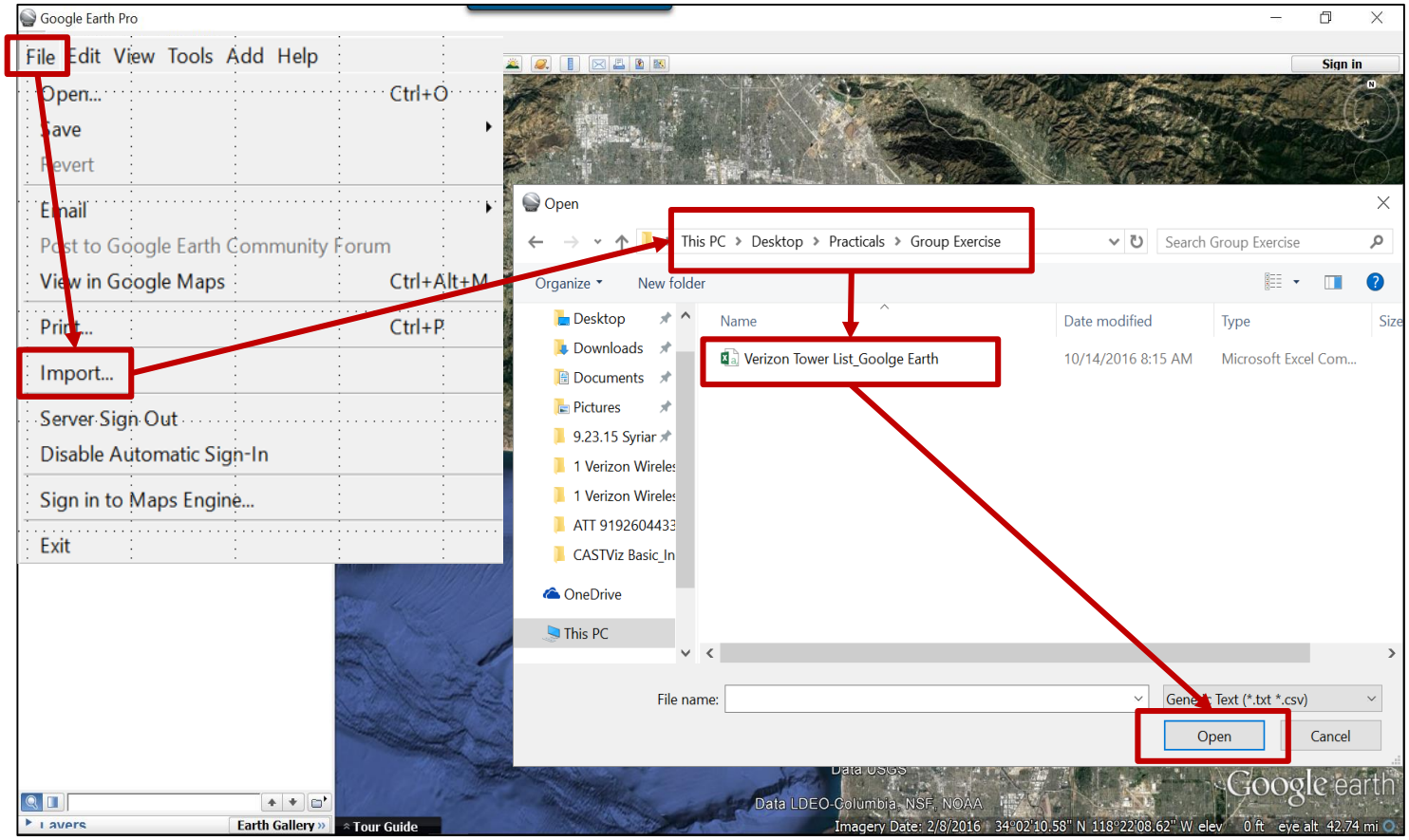
- The RULER tool can be used to create a line or a circle with a specific radius from a known location.



Google Earth Pro

Uploading Towers

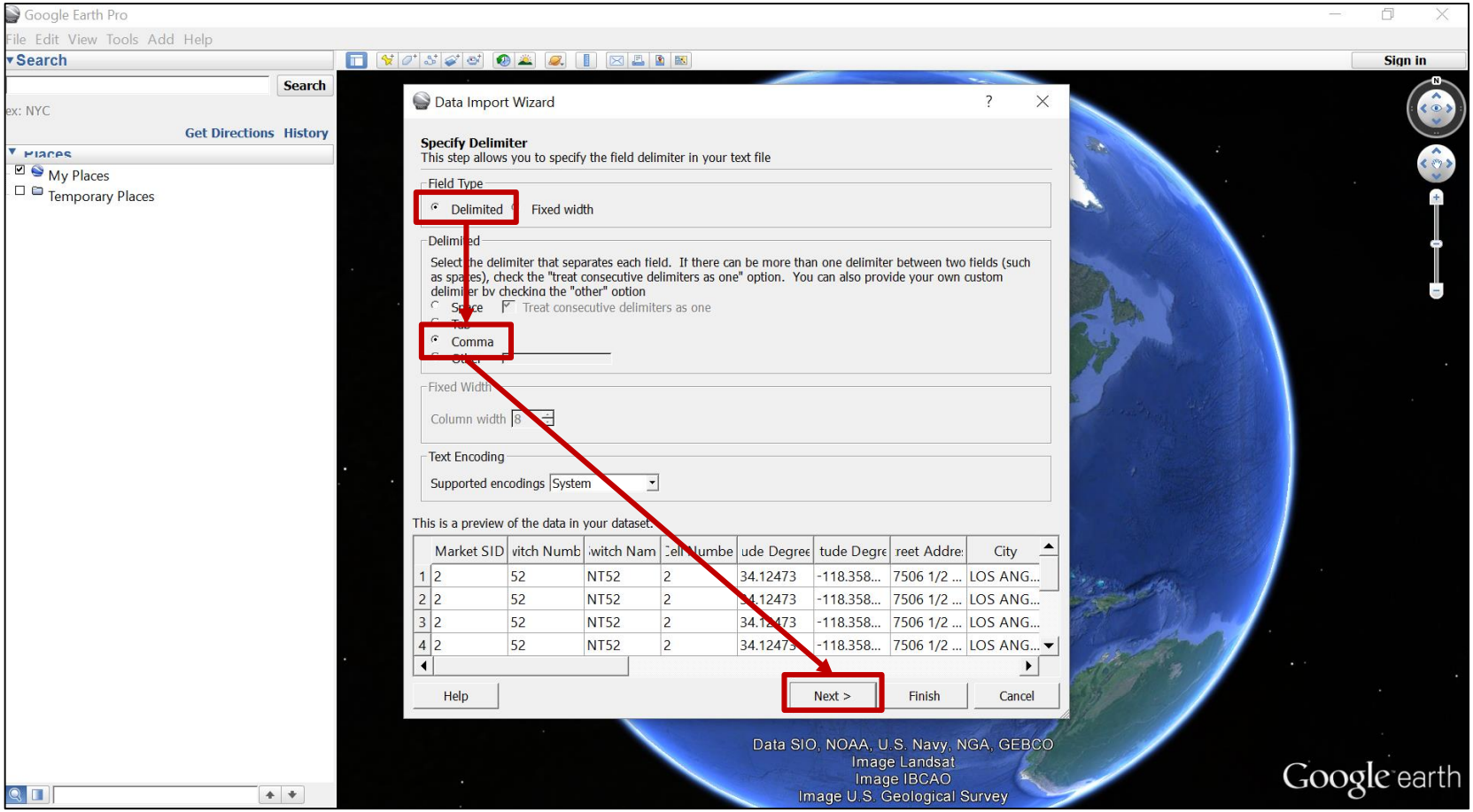
- Under the FILE tab select IMPORT.
- Navigate to the Student folder and select VERIZON TOWER LIST Google Earth



Google Earth Pro

Uploading Towers

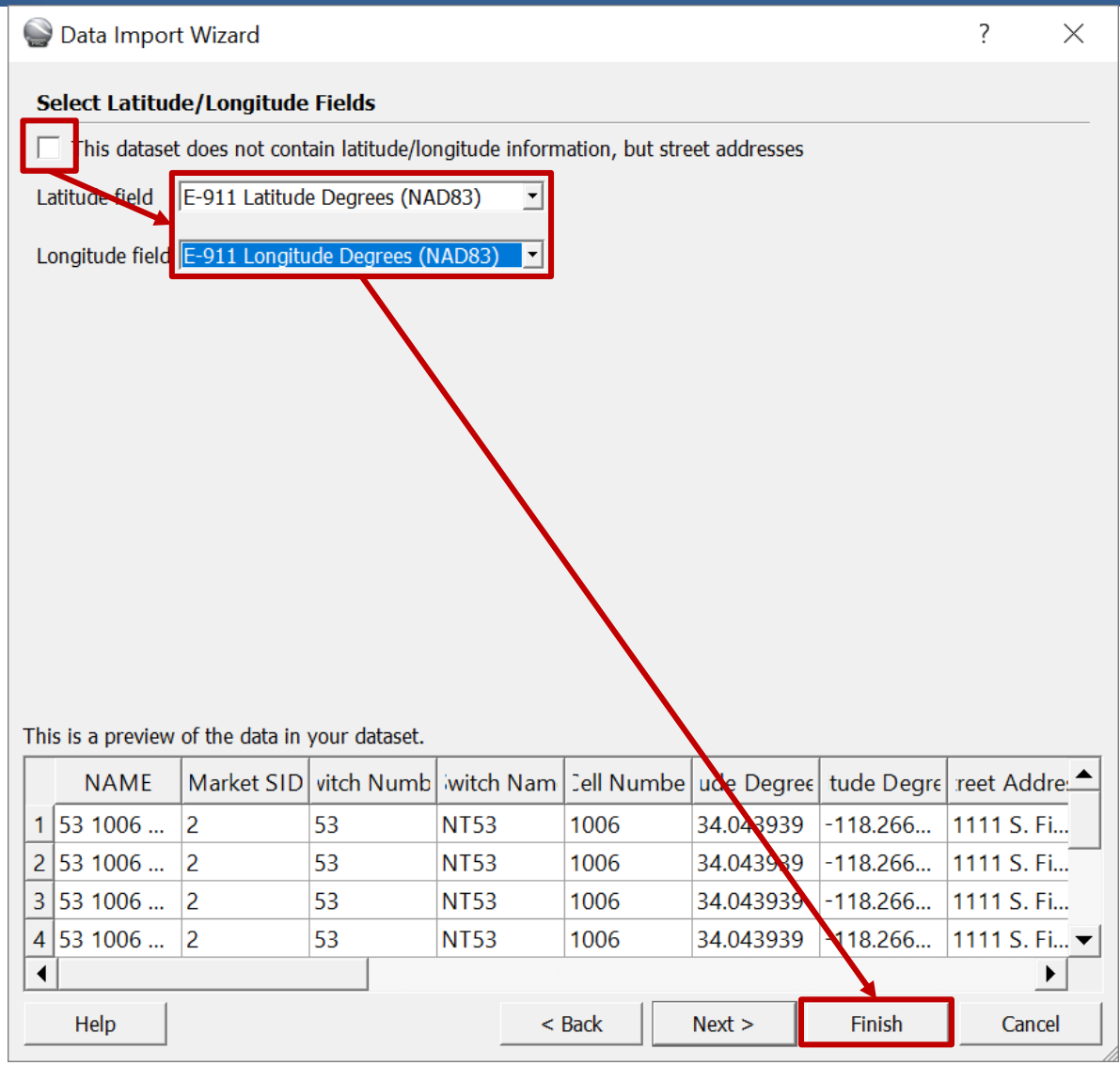
- The Data Import Wizard will help define the delimiters in the Tower List in order to assign columns and rows for import. Select: Delimited>Comma>Next



Google Earth Pro

Uploading Towers

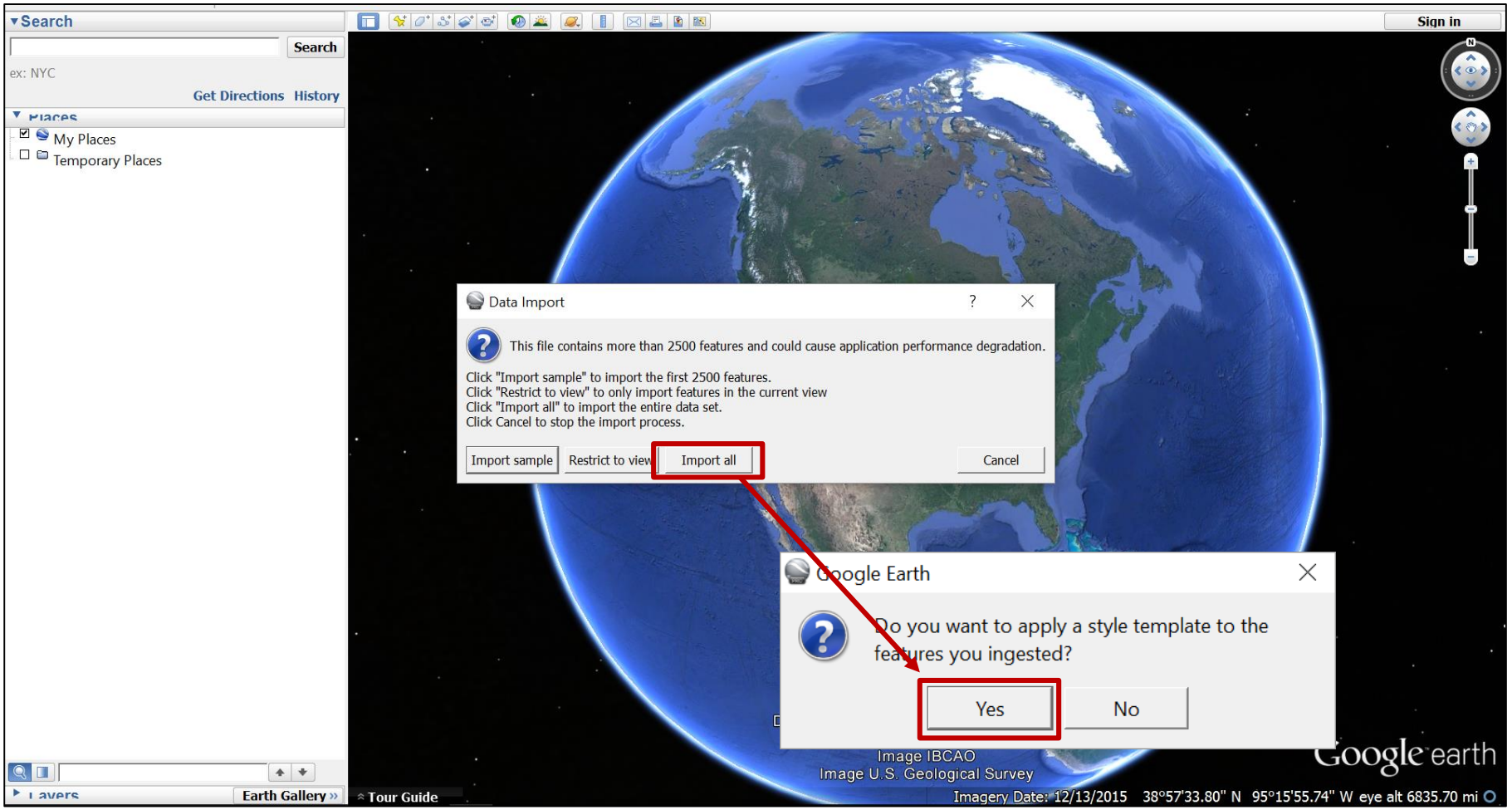
- Uncheck this box if checked
- Use the drop downs to select the columns that contains the LATITUDE and LONGITUDE.
- Select Finish



Google Earth Pro

Uploading Towers

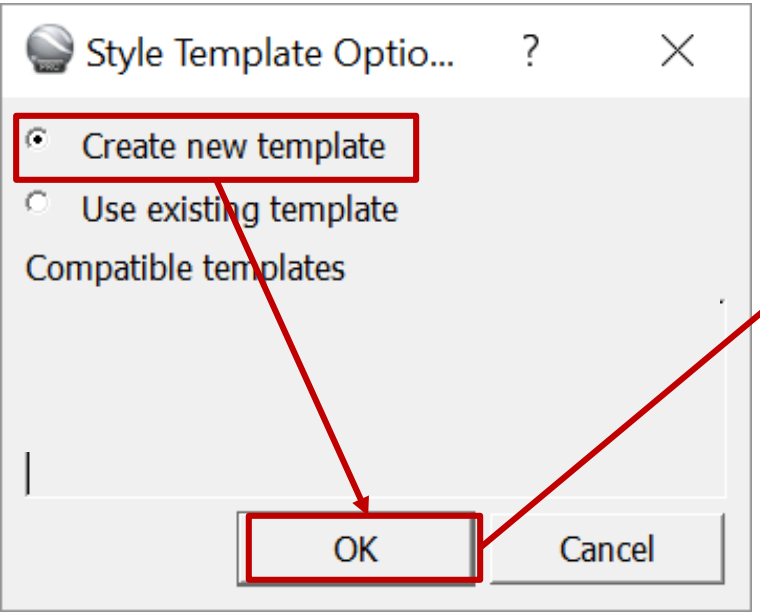
- The Data Import dialogue box will appear. Select IMPORT ALL.
- The Google Earth dialogue box will appear next. Select YES.

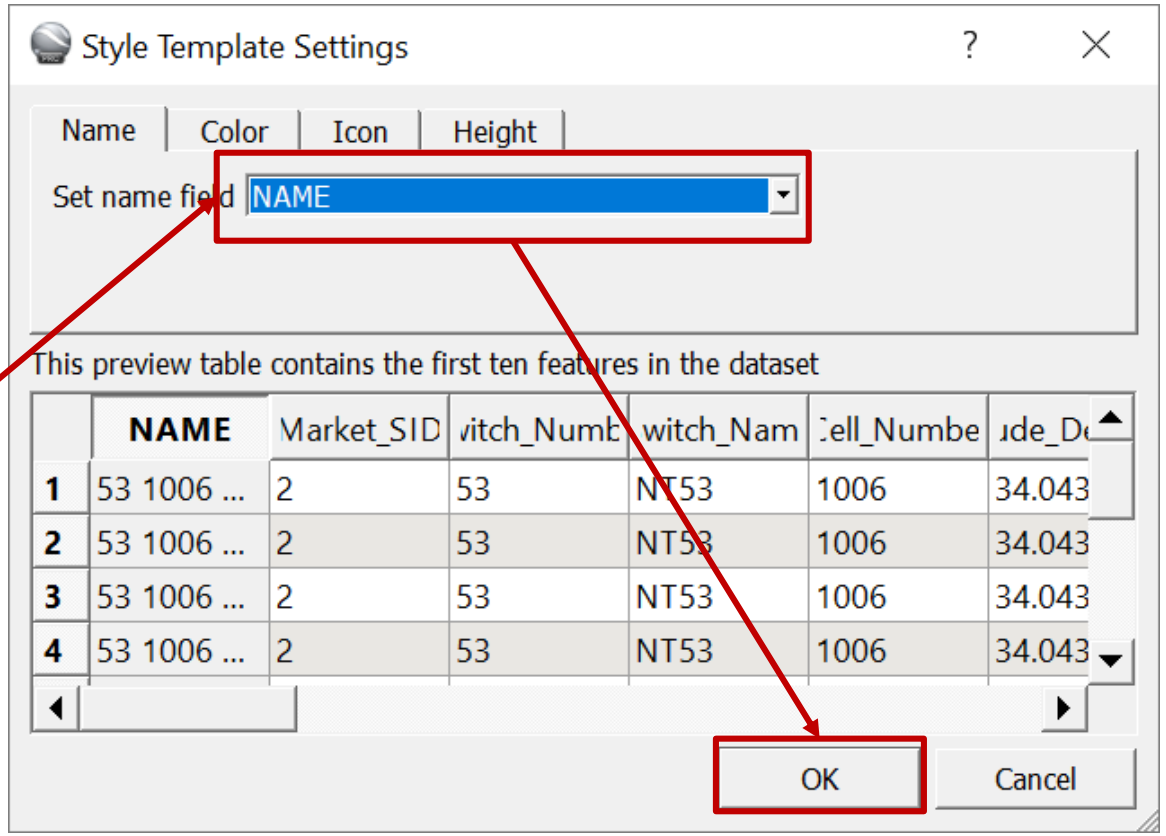


Google Earth Pro

Uploading Towers

- Create new template. Select OK.
- Use the drop down to select the first Column "NAME." This is a column added by the instructors using the Excel Skill Concatenate. This skil combines the Switch, Cell Number, Sector, and Azimuth so that there is unique NAME for the Towers loaded into Google Earth.
- Select OK.

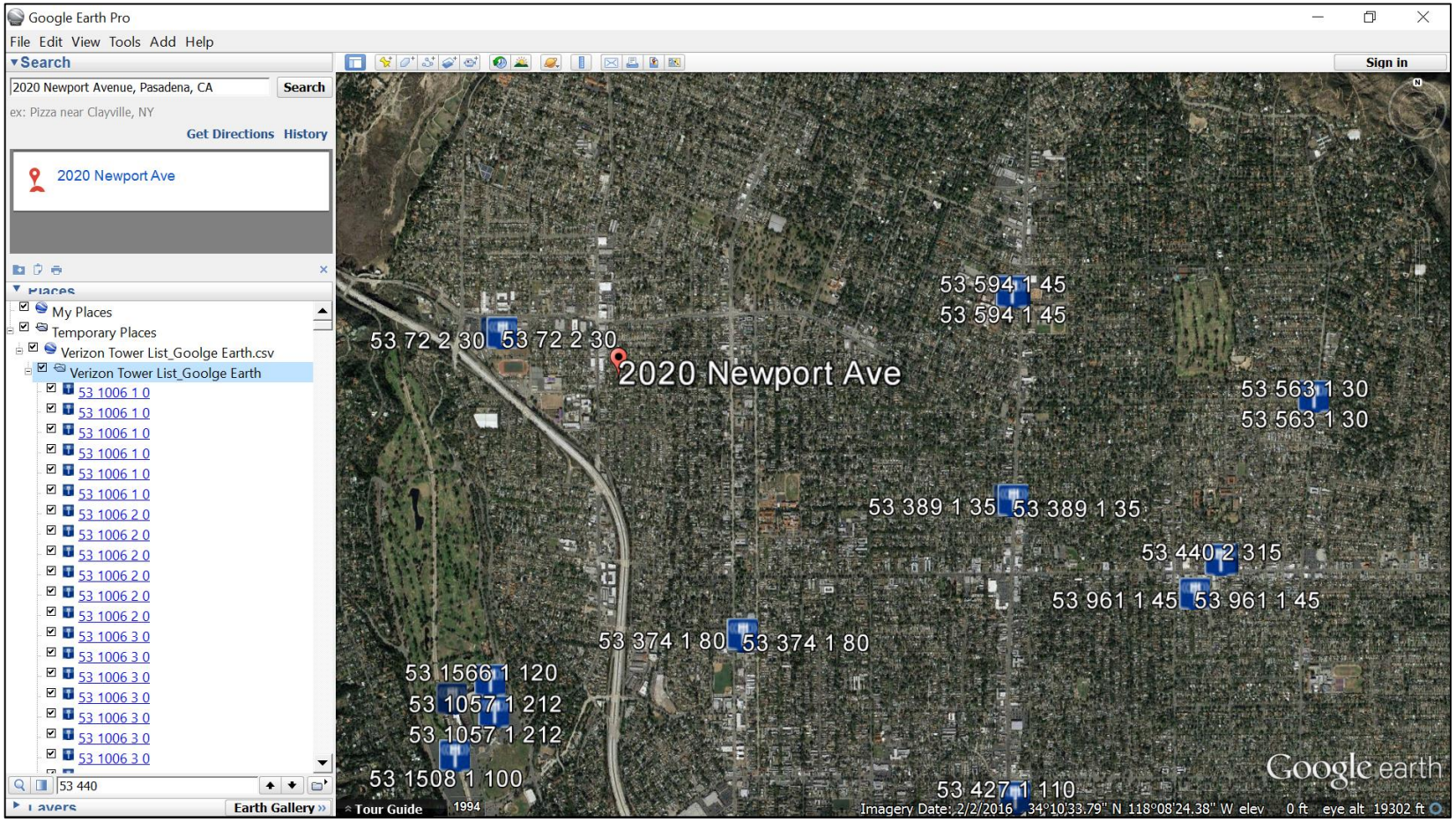




Google Earth Pro

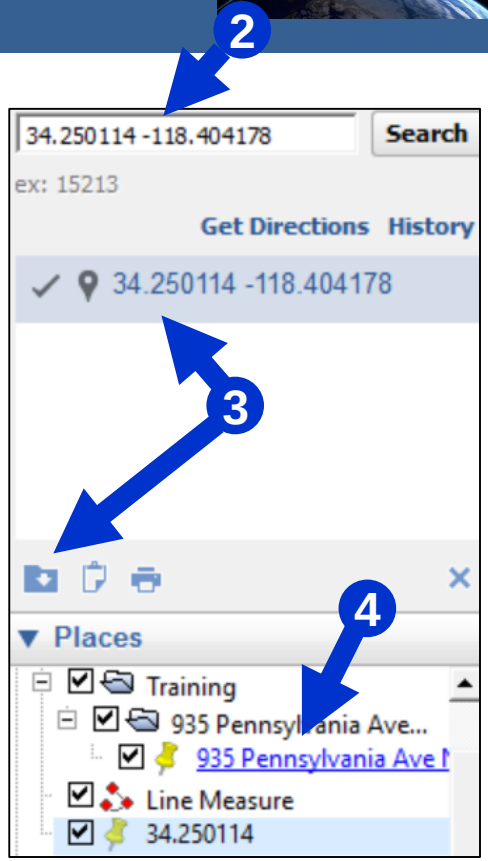
Uploading Towers

- This is what the map will look like once the Tower List is uploaded.



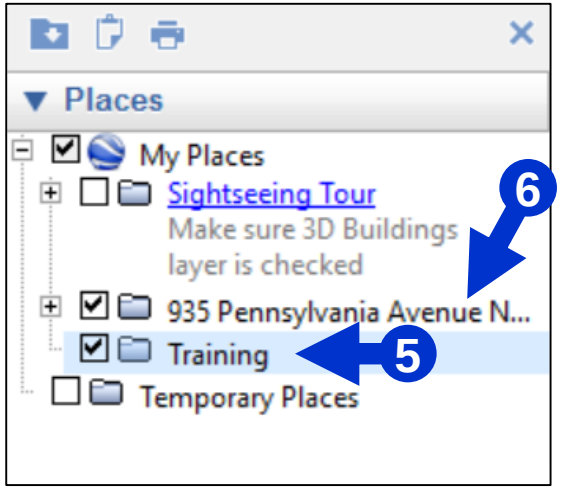
Google Earth Pro

52 207 1 110	2	52	NT52	207	34.250114	-118.404178
52 207 1 110	2	52	NT52	207	34.250114	-118.404178
52 207 1 110	2	52	NT52	207	34.250114	-118.404178
52 207 1 110	2	52	NT52	207	34.250114	-118.404178



Uploading CDRs

1. Review the CDRs against the Tower List to determine the lat/long of each call (tower) location you want to plot.
2. Then in Google Earth, type the lat/long from the tower list into the search bar.
3. Click on the lat/long that appears, and drag to the folder icon. This will save the location to your Places.
4. Right click on the place and rename it.



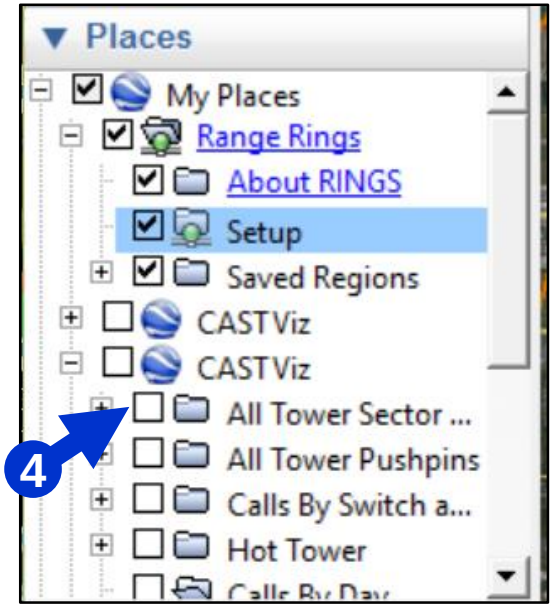
Saving Data / Creating Folders

5. First create a folder specific to your case within "My Places". Just right click on "My Places". Click on Add Folder. Create a name for your folder.
6. Then drag and drop all pertinent locations into the folder. (For example, you could drop 935 Penn. into the Training folder)

Google Earth Pro

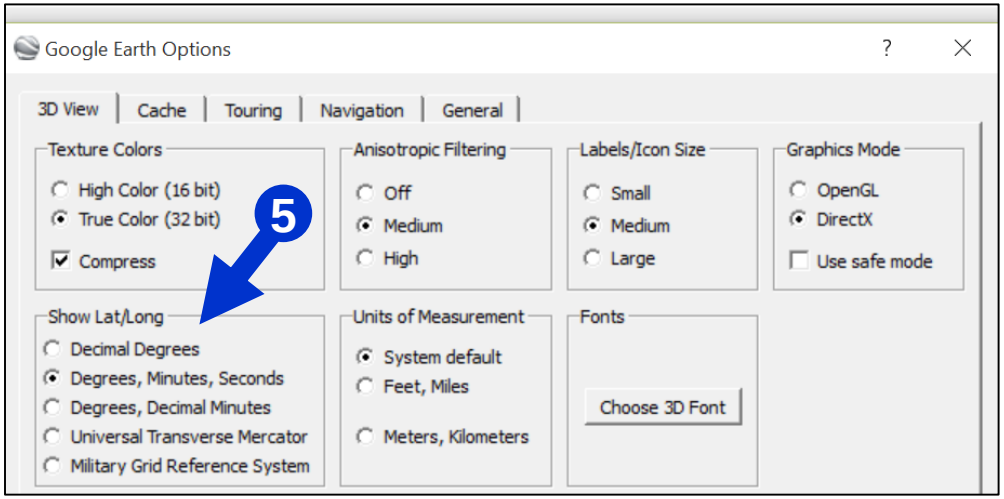
Email .kmz Files

1. Drag everything you want, including any temporary places you want saved into the folder you created in "My Places"
2. Right click on the folder and save as a KMZ file to your drive
3. KMZ files can be attached to emails in order to share Google Earth results.



Viewing My Places on the map

4. Click in the checkbox to view or hide locations on a map.



Change GPS from Decimals to other Formats

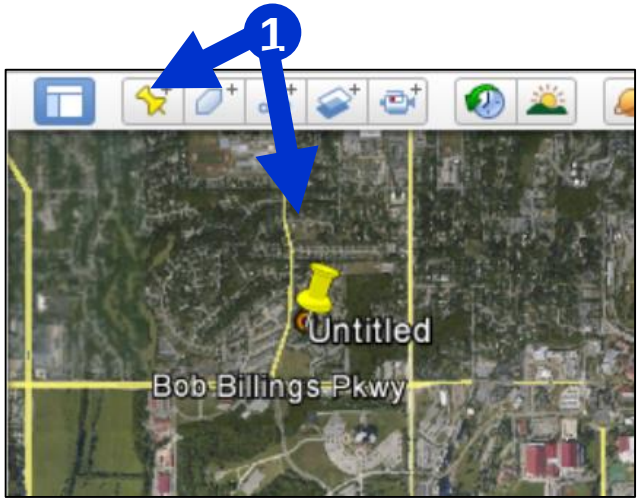
5. Click on Tools > Options > Then choose the format you want > Then click Apply.

Google Earth Pro

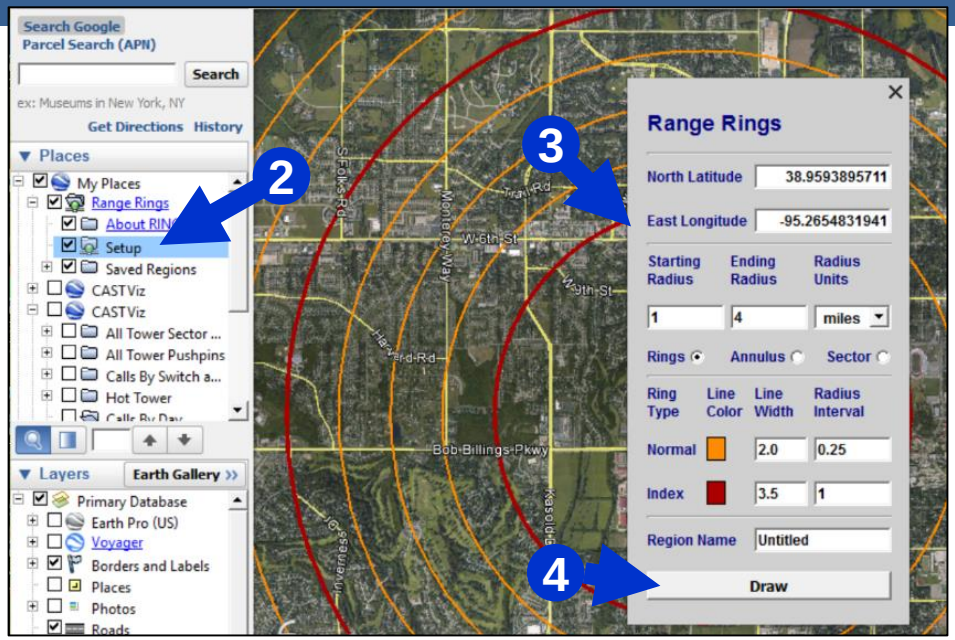
Range Rings for Google Earth (RINGS)

- To include rings or arcs, this add-on to Google Earth is helpful: http://www.metzgerwillard.us/rings/rings.html
- RINGS is an online tool that draws concentric circles, an annulus, or a sector of an annulus in Google Earth.

1. Start by adding a place mark at the desired location, and then double click on the place mark to get it to move to the center of the view.
2. Check the box beside "Setup".



Note: To save range rings from one Google Earth session to another, right-click on Saved Regions and select Save to My Places.

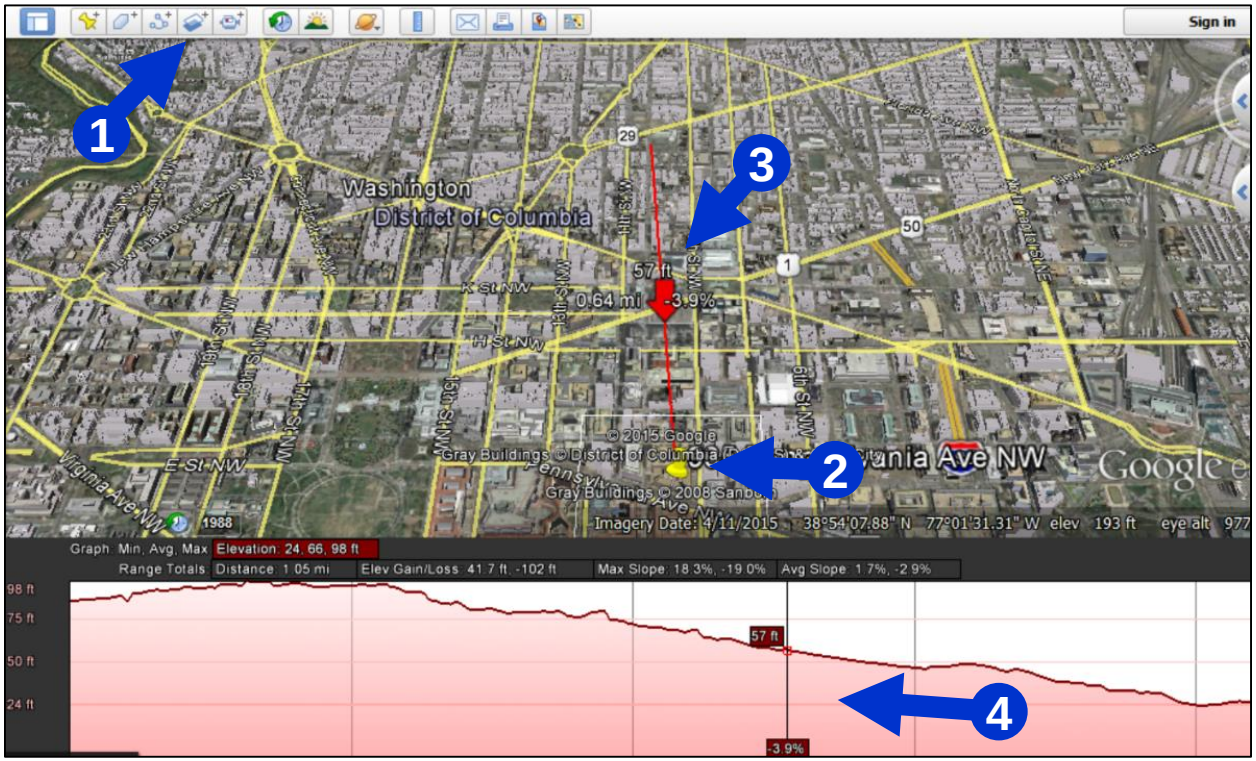


3. Fill out the box that appears, and choose Rings, Annulus or Sector.
   - Ring radii: minimum radius interval is 10 for feet or meters and 0.25 for miles or kilometers. A maximum of 200 rings may be drawn per query.
   - Annulus or sector of an annulus: to draw a disk or sector of a disk, enter 0 for the Starting Radius.
4. Click Draw.
5. To use the tool again, add another place mark and re-center it, or just re-center your original place mark.
6. Check the box beside Setup again and Click Refresh from the Edit menu.

Google Earth Pro

How to Look at Elevation

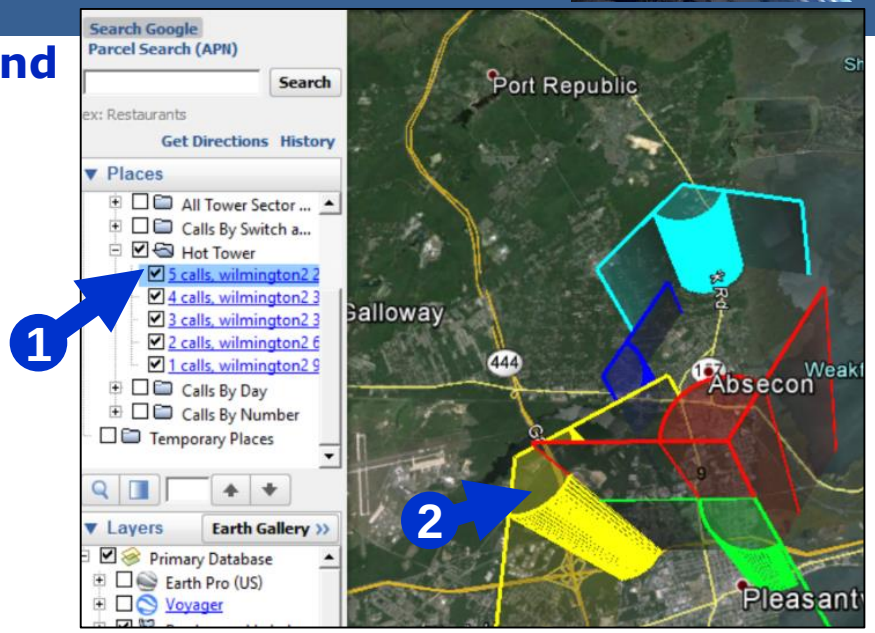
1. Click on the add path icon.
2. Click on your desired location and then click on the desired end location. Click OK. A line will appear between the two points.
3. Right click on the line, click show elevation profile.
4. If you drag the cursor over the elevation diagram from left to right, the elevation location will be highlighted on the map.

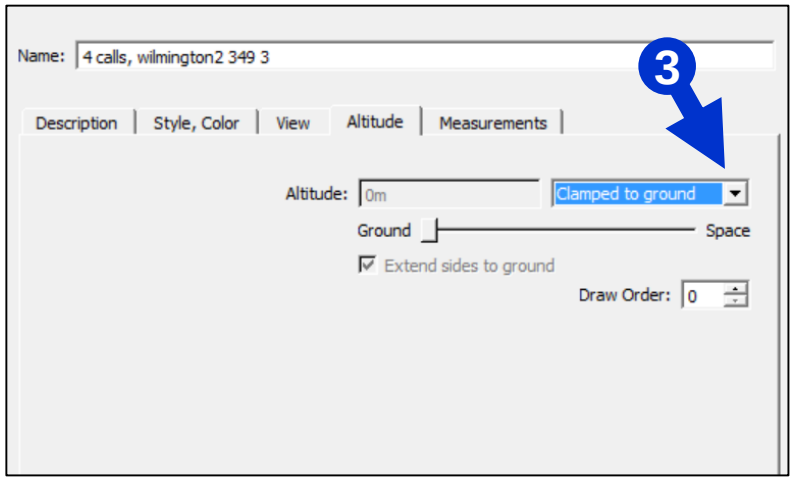


Google Earth Pro

Clamp CASTViz Hot Tower Images to Ground

1. Make sure the checkbox next to Hot Tower is checked.
2. Right click on a tower you want to clamp to ground.
3. Click on the Altitude tab, and change the drop down to "Clamped to Ground".





4. The towers will flatten, but to view the details, just click on the tower.

Location Based Services & Engineering Data Sets

Major Cell Phone Provider Overview

The Providers section of this manual has more details on each of these services

	Engineering Data Sets	Location Based Services
AT&T	NELOS: Generates location event data via probes on the mobile network. Use cautiously. AT&T does not validate results. AT&T Messaging results: Can get content and photos if subscriber has this feature turned on.	Mobile Locate: Triangulated coordinates of device based on Timing Advance or Time on Arrival (TOA) and suspected radius e-mailed every 15-30 min. Use event based mobile locate.
T-Mobile	True Call: T-Mobile's PCMD. Timing Advance Data.	E-911: 3 to 6 tower triangulation based on Timing Advance or Time on Arrival (TOA).
Sprint	Per Call Measurement Data (PCMD): Provides an estimate of the location of the device using a Round Trip Delay measurement from the tower. The Lat/Long provided is NOT a GPS coordinate. Time stamps are based on switch time and are held for 2 weeks to 90 days. Evolution Data Optimized (EVDO): Same as PCMD, but for data instead of voice calls. Long Term Evolution (LTE): Same as PCMD, but for LTE usage.	Ping: The network sends a message to the phones internal GPS receiver to report it's location (must see min. of 4 satellites. GPS coordinates of device and suspected radius from tower e-mailed(or through L-Site website) every 15 minutes for 30 days. Can be done manually every 5 minutes.
Verizon	Real Time Tool (RTT): Verizon's PCMD provides sector/tower and distance from tower with confidence rating only on the last call/sms/data activity. The Lat/Long provided is NOT a GPS coordinate. RTT is available for 7-10 days. Actual Content of Text Messages is held for 3-10 days.	Verizon has a new location tool. Radius' are currently very large, so RTT should be used also, and is based on the last call/sms/data activity and provides sector/tower and distance from tower with confidence rating. Must call to request.
U.S. Cellular	PCMD: Provides an estimate of the location of the device using a Round Trip Delay measurement from the tower. *Only available in Lucent markets.	No. However, you can force a call without a ring to the target device to determine tower/sector.

E-911 / Mobile Locator Tool

- T-Mobile and AT&T offer law enforcement triangulation service as part of their enhanced 911 capabilities. Both services are considered network solutions and perform the same function:
  - T-Mobile offers E-911 Locator
  - AT&T offers Mobile Locator tool
- Triangulation is the network's ability to utilize the Timing Advance or Time of Arrival (TOA) positioning mechanism. TOA positioning method is based on measuring the Time of Arrival (TOA) or (Timing Advance) of a known signal sent from the cell phone and received at three or more measurement units (towers).

UNCLASSIFIED//LES

Common Device Analysis

Tower Dump Uses

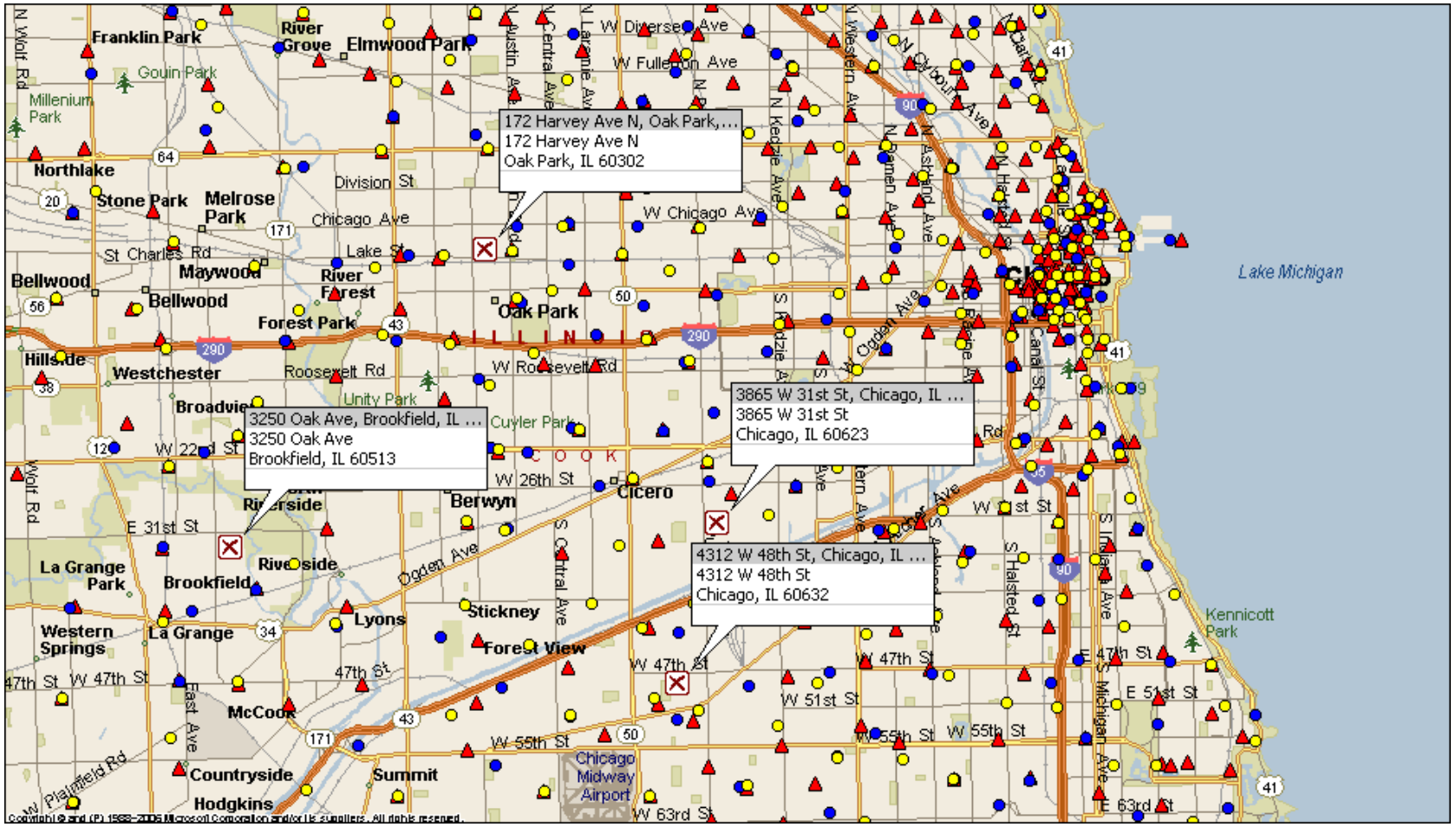
Tower Dumps are helpful when specific cell phone numbers have not been identified, however they can be expensive. Cell phone providers only preserve CDRs for a limited time, yet tower dumps are retained longer. Tower dumps can provide a wealth of information regarding which phones were in a specific place and time. Legal Threshold: Need a court order or search warrant.

- **Specific Crime**: Determine phones used in the area
  - Preserve data in case a future suspect develops
  - Narrow suspect pool based on knowledge (outgoing call only, 3 minute conversation, not in area after crime, etc.)
  - *Example:* Lane Bryant store where a suspect shot 6 women, no suspect

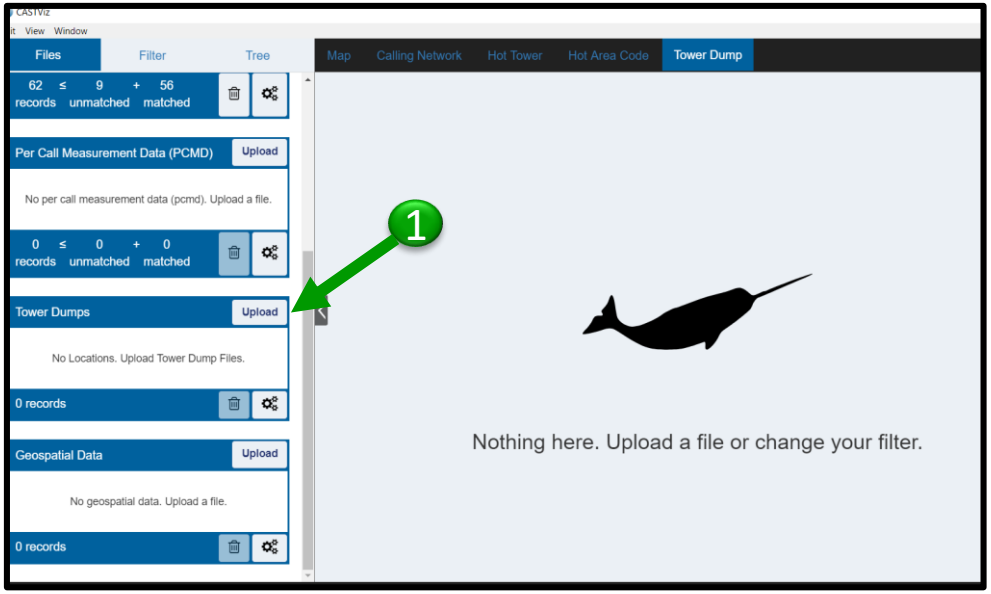
- **Multiple Crimes**: Different locations and times
  - Compare data received for a common number
  - *Example:* Detroit jewelry store heists – knew suspects were using cell phones due to surveillance cameras

Tower Dump Example: Series of Robberies

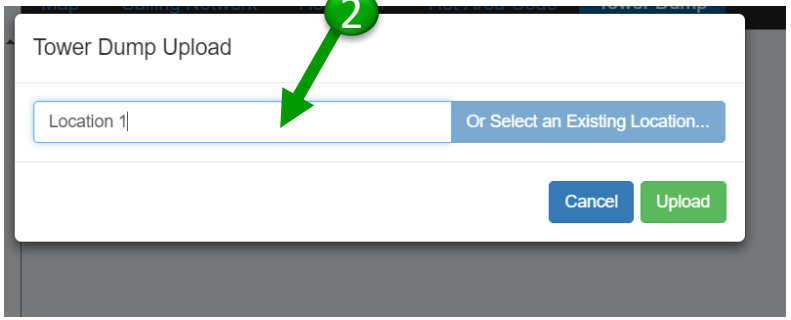
Events must be separated by enough distance to make tower dumps effective.
Tower dumps can be uploaded and analyzed in CASTViz.

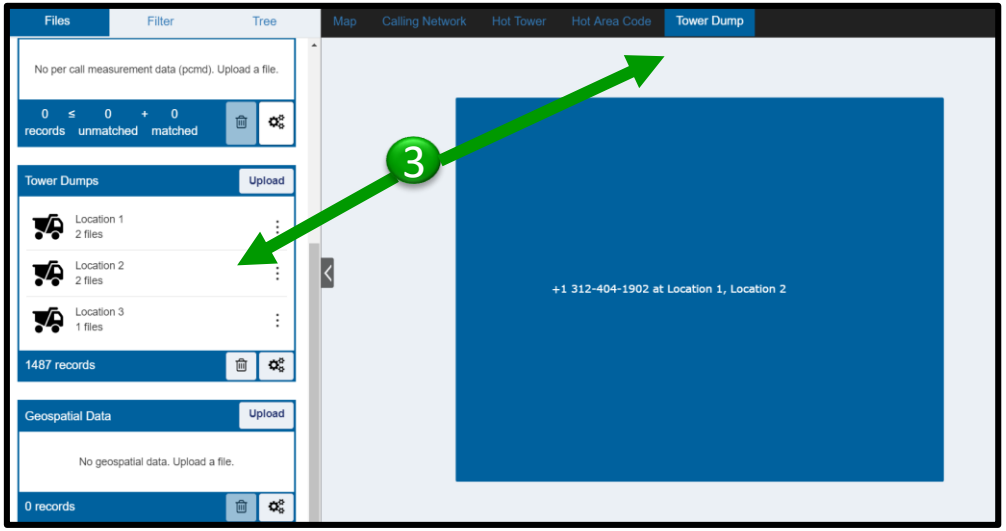


Tower Dump: CASTViz



1. Upload the raw tower dump files from the providers.
2. Create a location name, and upload all tower files for that location. Then create the next location name (ie Location 2) and upload those location files.





3. Once you upload the tower dumps for all locations, click on the tower dump tab at the top to see if there are any common numbers.

Tower Dumps

Provider	Voice	SMS	Data	PCMD/ RTT	Availability/Cost
Sprint	Y	N	N	N (only phone-specific)	Data is available for 18 months. $50 per tower.
verizon wireless	Y	Y (CDRs)	Y	Y	RTT data is available for 8 days and is $5 per 15 min per tower. Without RTT, data is available for 1 year and is $5 per hour per tower.
at&t	Y	Y	Y	N/A	Data is available for 60 days. $45 processing fee, and $25 per tower.
T-Mobile	Y	Possible	N	N/A	Data is available for 6 months. $50 per tower.
U.S. Cellular	Y	N	N	N/A	Data is available for 1 year. $50 per tower.

Common Device Analysis

Through investigation, many different types of identifiers may be obtained apart from the information received in a tower dump. The following are examples of identifiers that you can use CASTViz to conduct a common analysis:

- IP Addresses
- MAC Addresses
- Serial Numbers
- Advertising ID's
- License Plate Reader (LPR's)
- Google ID's
- Telephone Numbers
- IMSI's
- ESN's
- MEID's
- IMEI's
- Social Security Numbers
- Data from Geo-fence Warrants

***Remember: CASTViz can be used to conduct analysis on any set of data to determine commonality.

Other Investigative Options

Exigent Requests

There are two types of Exigent Requests. Voluntary Disclosures and compelling a provider to provide records due to Exigent Circumstances. The following explains both of these methods of obtaining exigency based records.

Voluntary Disclosure of Records (commonly referred to as "exigent requests"):

- Pursuant to 18 U.S.C. § 2702(c)(4) provides, in part: "A provider described in subsection (a) may divulge a record or other information pertaining to a subscriber to or customer of such service (not including the contents of communications)……to a governmental entity, if the provider, in good faith, believes that an emergency involving danger of death or serious physical injury to any person requires disclosure without delay of information relating to the emergency."
  - Providers have the discretion to refuse or except these requests based on the information they are provided by law enforcement.
  - FBI personnel must obtain ASAC approval for the exigent request for records.

Compelling an Exigent Response:

- The Pen Register statute's emergency provision, 18 U.S.C. § 3125, allows for compelling records from a provider. It requires approval at the Deputy Assistant Attorney General (DAAG) level or above, which is coordinated through the DOJ Office of Enforcement Operations (OEO). It also requires a follow-up court order.
- Section 3125 is occasionally used, but not often, as investigators can often obtain a pen register order more easily than complying with 3125's requirements.

Facebook / Instagram

Address:	Facebook, Inc. Attn: Security Department/Custodian of Records 1601 S. California Avenue Palo Alto, CA 94304 subpoena@facebook.com

- **Send all record requests through the Facebook law enforcement portal: www.facebook.com/records**
  - Request logon, logoff, and interconnect and intra-connect activity

- **Subpoena** for non-content related data (basic subscriber info)
- **Court order** for limited content (ie. messages over 180 days)
- **Search warrant** for remaining content (photos, private messages, friend lists, etc.) and/or preservation of records
  - Provide: Facebook user ID, group ID, associated user name, group name, or an e-mail address(s)
  - Facebook ID is in the subject's profile page URL. (ie. http://www.facebook.com/profile.php?id=29445421)
    - *Note: currently Facebook ID's are being masked by Facebook*
  - Facebook will return data via e-mail in PDF or text formats.

Facebook now provides records in two different formats. In addition to PDF, you now have the option to download a .zip archive of your records. The archive format allows you to view records organized by file type, which may allow for easier searching and parsing. Archive format records can be authenticated using a hash, a unique alphanumeric identifier.

The archive format is recommended when your legal process contains a request for video or other large media files. Please note that XML is not available at this time. The PDF format option is still available for all records.

Google

Phone:	(650) 253-3425 for Emergency Disclosure

- Submit requests via the LERS: edrlawenforcement@google.com
  - Request logon, logoff, and interconnect and intra-connect activity

- https://support.google.com/legal-investigations/contact/ler

- Google Voice: Request toll records, IP address information, email, google voice target ID, Android ID, Apple ID and all forwarding phone numbers (this is the true phone using the google voice app)
- This requires a 2703d order or search warrant

Google WILL notify user of all requests UNLESS the order is sealed or is a child exploitation order.

Apple

Phone:	**Global Security Contact Number: 408-974-2095** (available 24/7 for exigent requests)

- Submit exigent requests from your official law enforcement email address, include a completed form, and email exigent@apple.com. Include "Emergency Disclosure Request" in the subject line.
- Apple's Emergency Law Enforcement Information Request Form can be found at https://www.apple.com/legal/privacy/le-emergencyrequest.pdf.
- Law enforcement guide: www.apple.com/legal/privacy/law-enforcement-guidelines-us.pdf
- Apple requests that search warrants be submitted in PDF format to subpoenas@apple.com, Attention: Privacy and Law Enforcement Compliance
- Standard law Enforcement e-mail is lawenforcement@apple.com
- Information available from Apple includes, but is not limited to, the following:

  - Device Registration
  - Customer Service Records
  - iTunes
  - Apple Retail Store Transactions
  - Apple Online Store Purchases
  - iTunes Gift Cards
  - iCloud
  - Find My iPhone
  - Extracting Data from Passcode Locked iOS Devices
  - Other Available Device Information
  - Requests for Apple Retail Store Surveillance Videos
  - Game Center
  - iOS Device Activation
  - Sign-on Logs
  - My Apple ID and iForgot Logs
  - FaceTime

* Additional Info: Keep in mind that text messages between iPhones are data sessions and that information will not be on CDRs

OnStar

- www.onstar.com

Contact Info:	• Call 888-690-2882 for each state's Corporation Service Company local address • Address the subpoena to: OnStar LLC, and mail it to the address provided by Corporation Service Company • No fee for submitting subpoenas

- OnStar customer service records (audio and/or general account information)requires receipt of a subpoena, court order, or other proper court issued document
- In the subpoena, identify date & time of the occurrence(s), description of the service, and/or account records being sought
- To locate an OnStar account provide at least one of the following:

1. Vehicle Identification Number, to include year, make, model
2. Subscribers full name and mailing address to include zip code
3. Home phone number on file
4. OnStar Account Number
5. OnStar Hands Free Calling (HFC) Number
6. Request to Identify an OnStar Good Samaritan will require the date of the call, and the OnStar case number provided to 9-1-1 dispatch by OnStar at the time of the call

OnStar

Vehicle Location(s) OnStar only maintains location data that is specific to a car when:

- There is a request for service initiated from within the car;
- There is a request for Stolen Vehicle Assistance or to locate a missing person;
- There is an Air Bag Deployment;
- There is an Automatic Crash Response;

All other location data collected and maintained by OnStar is anonymized and cannot be tied back to a specific car or event.

Vehicle Activity OnStar does not create, receive or maintain vehicle activity such as speed, braking, ignition cycles, lock status, etc. You can contact the vehicle manufacturer regarding any data their system(s) may have. If the car is equipped with AACN we may have airbag data, maximum reported Delta V, direction of impact and roll over status.

Vehicle Speed OnStar does not maintain speed data that is specific to a car, account or customer.

Audio files are ONLY created for voice calls that go into or through the OnStar Call Centers from a landline call, a blue button or emergency button key press, or from an airbag/automatic crash response signal from the vehicle. We do NOT have audio files from inside the vehicle when there is an established data connection with the vehicle. (i.e. when actively assisting law enforcement with locating a stolen vehicle, when updating the vehicle's location to provide service, when placing a call to emergency services providers.)

Call detail/toll records; OnStar is a reseller of cellular minutes which are purchased by the subscribers on a pre-paid basis; therefore OnStar does not have Call Detail records. Minimal call data is received from our carrier 90 days after the date the Hands Free Calling (HFC) service was used, that detail being the date of the call, duration of the call, number dialed and number calling 90 days after the call was made.

OnStar does not create or provide transcripts of audio recordings. OnStar cannot guarantee that an audio recording was taken at the time of a call or that a call can be retrieved and restored from our archives. OnStar maintains audio for 90 days from the date of the call.

[2] If you are unable to submit a subpoena at this time, OnStar will preserve the audio and/or records, if made and available, upon written request.

[3] For all civil matters, per our privacy statement, we require either documentation of our subscribers consent and/or documentation of Notice of Discovery to obtain their records. NOTE: OnStar is not governed by HIPPA or FOIA.

Cellular Provider Information

Major Cell Phone Provider Overview

	Contact Info	Acquired Companies/Resellers	Technology Type	Engineering Data Sets	Location Based Services	Other
AT&T	(800) 635-6840	Cricket; Alltel; 7-11 Speak Out; Beyond Wireless; Bratz Mobile; Circle K - Talk and Go Mobile; cool. Prepaid; Firefly Mobile; GoPhone; Graffiti Wireless; GTC Wireless; Hop-On; KORE Wireless; Locus Mobile; NET10; Teleplus; Tuyo Mobile; U Prepaid; XE Mobile	GSM (2.5G) rarely seen it most markets; UMTS (3G); LTE (4G)	NELOS: Generates location event data via probes on the mobile network. Use cautiously. AT&T does not validate results. AT&T Messaging results: Can get content and photos if subscriber has this feature turned on.	Mobile Locate: Triangulated coordinates of device based on Timing Advance or Time on Arrival (TOA) and suspected radius e-mailed every 15-30 min. Use event based mobile locate.	Use data cautiously during investigation and DO NOT rely on data for testimonies.
T-Mobile	(973) 292-8911	metroPCS	GSM (2.5G); UMTS (3G); LTE (4G)	True Call: T-Mobile's PCMD. Timing Advance Data.	E-911: 3 to 6 tower triangulation based on Timing Advance or Time on Arrival (TOA).	Use data cautiously during investigation and DO NOT rely on data for testimonies.
Sprint	(800) 877-7330	Boost Mobile; 9278 Mobile; Bravo Wireless; Global Talk PCS; GSR Mobile; Liberty Wireless; Mobile ESPN; MoveU Mobile; Movida Communications; PhoneCo; PlatinumTel Communications; STI Mobile; Time Warner; Total Call; Uphonia; Virgin Mobile USA; ZUMA Prepaid Wireless	CDMA (2G/3G); LTE (4G)	Per Call Measurement Data (PCMD): Provides an estimate of the location of the device using a Round Trip Delay measurement from the tower. Time stamps are based on switch time and are held for 2 weeks to 90 days. Evolution Data Optimized (EVDO): Same as PCMD, but for data instead of voice calls. Long Term Evolution (LTE): Same as PCMD, but for LTE usage.	Ping: The network sends a message to the phones internal GPS receiver to report it's location (must see min. of 4 satellites. GPS coordinates of device and suspected radius from tower e-mailed(or through L-Site website) every 15 minutes for 30 days. Can be done manually every 5 minutes.	No tower info provided on SMS records. Do not use the lat/long in PCMD records, use the tower distance.
Verizon	(800) 451-5242	Alltel; Amp'd Mobile; IDT; MobilePro; CloseCall; Omni Prepaid; Page Plus; Rockit Talk	CDMA (2G/3G); LTE (4G)	Real Time Tool (RTT): Verizon's PCMD provides sector/tower and distance from tower with confidence rating only on the last call/sms/data activity. RTT is available for 7-10 days. Actual Content of Text Messages is held for 3-10 days.	No. However, Verizon is working on creating a tool. RTT can be used though, and is based on the last call/sms/data activity and provides sector/tower and distance from tower with confidence rating. Must call to request.	
U.S. Cellular	(630) 875-8270	Carolina West Wireless	CDMA (2G/3G); LTE (4G)	Per Call Measurement Data (PCMD): PCMD provides an estimate of the location of the device using a Round Trip Delay measurement from the tower.	No. However, you can force a call without a ring to the target device to determine tower/sector.	

Provider Retention Periods

(As of March 2019)

Provider	AT&T	Cricket (AT&T)	T-Mobile	MetroPCS (T-mobile)	Sprint	Verizon	US Cellular
Subscriber	7 years	12/20/2015-present	2 years prepaid; since account opened with postpaid	2 years	10 years	3-5 years	7 years
Call Detail Records	7 years	12/20/2015-present	2 years prepaid; since account opened with postpaid	2 years	18 months; backup tapes available 2005 to present	1 year	1 year
Cell Site (Voice)	7 years	12/20/2015-present	2 years	2 years	18 months	1 year	1 year
SMS tolls	7 years	12/20/2015-present	2 years	2 years	18 months	1 year	1 year
Cell Site (SMS)	7 years	12/20/2015-present	2 years	2 years	No CDR, Yes Reveal (PCMD) for 90 days	No CDR, Yes RTT (PCMD) 8-30 days	No
SMS content	No (AT&T msg app 90 days; ~10%)	No	No	No	Only on T-III	7 days	3-5 days
Cell Site (Data)	7 years	12/20/2015-present	No	No	90 days (if request IPDR Report)	1 year	No
Tower Dumps	7 years	12/20/2015-present	2 years	2 years	18 months	1 year	1 year
Prospective	Mobile Locate (Triangulation / AGPS)	Mobile Locate (Triangulation / AGPS)	E911 (Triangulation)	No	GPS "Ping" (device dependent)	Yes	No, but force "no ring" call
PCMD/RTT (Historic)	No, but NELOS (90 days)	No, but NELOS (90 days)	No	No	PCMD (~90 days SMS & voice; 2 weeks data)	RTT 8 days	PCMD (30 days)
WiFi Calling	Pending	Pending	App / Open WiFi	No	18 months	On VoLTE report only	No
VoLTE	Yes	Yes	Yes since account opened	No	Yes 90 days	Yes 1 year	Yes 1 year
Store Video	Yes	Yes	15-45 days (sbp)	15-45 days (sbp)	2-3 months (sbp)	30 days (sbp)	30-60 days (sbp)
Voicemail	Yes- all stored VMs	Yes- all stored VMs	14 days	14 days	20 days	No	No
Cloud Storage	AMS	AMS				Via Synchronoss	
Internet/Web Browsing	1 year	1 year	No	No	No	187 days	No

Preparing CDRs for Use in Mapping Programs

Provider	For Use in Google Earth or other mapping program	Into CASTViz
AT&T	1. Import Txt file into Excel, and use text to columns (Delimited) 2. Insert a tab after column B. In the new column use the formula =b2-7/24 for UTC to PDT 3. Drag the formula down the entire spreadsheet 4. Create tabs for voice, data, sms. Do not map the data tab 5. In the voice tab, use Text to Columns to separate "Cell Location" Column into LAC, CID, Latitude, Longitude, and Orientation. 6. Sort so times are in chronological order 7. Add filters and filter for the timeframe of interest. * Fields that match tower list: LAC, CID, and Orientation	Do not alter the Txt file. Import raw files. Can Import CDR as Tower file also.
T-Mobile	1. Freeze top row (View > Freeze Panes > Freeze Top Row) 2. Adjust "Start Time" column to correct time zone, then sort in chronological order 3. Add filter to top row (Home > Sort & Filter > Filter) 4. Filter for needed timeframe * Fields that match tower list: 1st LAC, 1st Cell ID, 1st Tower Azimuth. For LTE: 1st LTE Site ID, 1st Tower Azimuth	Save as an Excel doc, then import. Can Import CDR as tower file also.
Metro PCS	1. See T-mobile (above)	Import the raw excel files.
Sprint	1. Freeze top row (View > Freeze Panes > Freeze Top Row) 2. Adjust "Start_Date" column to correct time zone, then sort in chronological order 3. Add filter to top row (Home > Sort & Filter > Filter). In the "M_R_#" column uncheck Routed Call and Undetermined data 4. Check 1st # in "1st CELL" column to determine if sectors are Lucent (2,3,4) or Nortel (1,2,3) 5. Filter for needed timeframe * Fields that match tower list: NEID, 1st CELL (this is the sector & the Cell#)	Import the raw excel files.
Verizon	1. Freeze top row (View > Freeze Panes > Freeze Top Row) 2. Adjust "Seizure Dt Tm" column to correct time zone, then sort in chronological order 3. Check First Serving Cell Face to determine if sectors are Lucent (2,3,4) or Nortel (1,2,3) 4. Add filter to top row (Home > Sort & Filter > Filter). Filter for needed timeframe * Fields that match tower list: Network Element Name, First Serving Cell Site, and First Serving Cell Face	Import the raw excel files. Tower list is a .CSV file.
U.S. Cellular	1. Freeze top row (View > Freeze Panes > Freeze Top Row) 2. Change time from local switch to correct timezone, if needed. Sort time in chronological order 3. If outbound call, use orig CLLI. If inbound call, use term CLLI 4. If Nortel, convert the orig CLLI and term CLLI from hex to dec: =HEX2DEC(Left(U7,3) 5. Add filter to top row (Home > Sort & Filter > Filter). Filter "Call Type" column for M. Filter for needed timeframe * Fields that match tower list: Orig CLLI or Term CLLI. Records show location for both the originating and receiving phone	CASTViz does not import this provider. Reinjest is required to parse records.

Preparing Tower Lists for Use in Mapping Programs

Get the tower list from the Cell Site Database Archives section.
Ensure the tower list is dated close to the time of the crime.

Provider	For Use in Google Earth or other mapping program	Into CASTViz
AT&T	Concatenate the LAC, CID, and Sector Orientation	Export from Cell Site Database, save, then import to CASTViz, and change the time from UTC. OR: upload the raw txt CDR file and change the time from UTC.
T-Mobile	Concatenate the LAC, Cell_id, and Orientation. (Just FYI- the sector is the 1st digit of the sector column.) For LTE, concatenate the eNodeB_ID, and Azimuth	Export from Cell Site Database, save, then import to CASTViz.
Metro PCS	Concatenate the Switch, Cell, and Sector	Export from Cell Site Database, save, then import to CASTViz.
Sprint	Concatenate the NEID, Cell #, Sector, and Azimuth	Export from Cell Site Database, save, then import to CASTViz. If Lucent, check the Lucent Box.
Verizon	Concatenate the Switch Name, Cell Number, Sector, and Azimuth. Save as CSV	Export from Cell Site Database, save, then import to CASTViz. If Lucent, check the Lucent Box.
U.S. Cellular	Concatenate Switch Name, Cell Number, Sector, and Orientation / Azimuth	CASTViz does not import this provider. Reinjest required to parse records.

MVNO (Cellular Resellers)

Mobile Virtual Network Operator (MVNO)

- Company that purchases network capacity to offer their own wireless services using the network of another telecommunications provider (i.e., Verizon Wireless, AT&T, Sprint).
- Examples of MVNO services:
  - Prepaid phone cards that can be bought at local convenience stores
  - Mobile phones ("burner phones") that are programmed to have prepaid wireless service once activated (ie. Boost mobile is a cellular reseller for Sprint)
- Subscriber and toll info is kept by MVNOs
- Telephone records & cell site data is kept by owner of network (same for roaming phones)

CDRs for MVNO "burner" phones are available.
The CDRs with the cell site data are available through the network that handled the call (ie. Verizon, Sprint).


at&t

AT&T

Address:	AT&T National Compliance Center 11760 US Highway 1, 4th floor/Ste 600 North Palm Beach, FL 33408
AT&T National Land Lines:	208 South Akard, 10th Floor Dallas, TX 75202

Contact Information:	
National Compliance Center	(800) 635-6840
National Compliance Fax	(888) 938-4715
Subpoena Compliance	(800) 291-4952
Fax (SW and East Region)	(248) 552-1764
Fax (West Region)	(248) 552-1793
Fax (Midwest Region)	(248) 552-3201
Fax AT&T Corp (All other regions)	(248) 552-3236

Technology: GSM (2.5 G), UMTS (3G), LTE (4G)

Cricket records are obtained by contacting AT&T.

AT&T

How They Will Send Records	• Will email the .PDF and .txt file(s) to secure law enforcement accounts. Always request the .txt file (which will include Voice, SMS, and data). • Records are also available on CDs
CDRs (voice)	• Includes incoming/outgoing complete, incomplete, and blocked calls, location, international calls, and roaming calls (AT&T users roaming outside AT&T network or customers of other networks roaming on the AT&T network)
CDRs (SMS)	• Includes sending and receiving information (e.g., when the text was sent and when it was received, originating and terminating numbers, location, etc.). Does not include content.
CDRs (data)	• Includes data (i.e. multimedia messages, email, web surfing, etc.) sent and received by mobile callers. Roaming data is also included. Only session times and locations are available. • Data sessions route differently than voice/SMS sessions through the network. At this time, CAST does not rely on data sessions for testimonial purposes.

AT&T

Cost Per Pen Register	• $325 installation fee, $5 for each day • No switch restrictions
Phrase to use in historical records orders/warrants	• "All available toll records to include call detail, cell site and cell site sector information from (date) to present, as well as any available NELOS records." • (A NELOS request will require a probable cause statement)
Calls to Destinations Search	• Subpoena requesting query of commonly called numbers by the target's previous device to determine a new target phone number • Use this if your subject drops phones frequently • No cost, 60 day limit
Engineering Data Set	• NELOS: Generates location event data via probes on the mobile network. Use cautiously. No QA is performed by AT&T.
Location Based Services	• Mobile Locator Tool (Triangulation): GPS coordinates of phone and suspected radius. Results emailed every 15 mins for 30 days. • Time Difference of Arrival (TDOA): Relies on measuring the signal from a device from two or more cell sites. The mobile switch compares the times to generate a lat/long for the caller.

AT&T NELOS
(Network Element Location Optimization Service)

CAST currently does not testify to the accuracy to NELOS

Network Events:

- **GPS**- Observes GPS/precision location information supplied by the handset in the course of the user permitting location services on the device to provide a location. Accuracy Rating: 1
- **FemtoCell**- Observes device connected to a FemtoCell, which is programmed to report GPS coordinates periodically to AT&T. Accuracy Rating: 2
- **Timing Advance / Round Trip Delay**- Generates location records for scenarios where low propagation delay indicates very near presence to a particular cell tower (within 200M). Accuracy Rating: 3-12
- **Signal strength**- Used to estimate location in two different ways but is more vulnerable to error in situations where the user equipment is in proximity of a radio repeater, a body of water or some other physical obstacle that could impact the signal strength.

NELOS Legend: Location Accuracy Key

	0	Location accuracy unknown
GPS	1	Location accuracy likely better than 25 meters
FemtoCell	2	Location accuracy likely better than 50 meters
Timing Advance / Round Trip Delay	3	Location accuracy likely better than 100 meters
	4	Location accuracy likely better than 200 meters
	5	Location accuracy likely better than 300 meters
	6	Location accuracy likely better than 400 meters
	7	Location accuracy likely better than 600 meters
	8	Location accuracy likely better than 1000 meters
	9	Location accuracy likely better than 1500 meters
	10	Location accuracy likely better than 2500 meters
	11	Location accuracy likely better than 5000 meters
	12	Location accuracy likely better than 10000 meters
Tower Sector Only	13	Location accuracy likely better than 25000 meters

AT&T NELOS

* Formal statement from AT&T. Dated Nov. 21, 2017.

at&t

NELOS was created by AT&T to be a resource for 3G network planning/troubleshooting and an enabler for market research and other location-based services. It is designed to be accurate in the aggregate; it is not designed to be accurate in each detail record nor is it guaranteed to capture location for all 3G network activity. There may not be NELOS records to correlate with every CDR produced by AT&T for voice, SMS or data usage.

NELOS receives input from AT&T 3G network probes and calculates location using a variety of methods, many of which use proprietary algorithms developed by AT&T research based on detailed analysis of large volumes of data.

NELOS determines location mostly by passive observation of control plane signaling information transiting information links between wireless network elements such as radio base stations and various core nodes. Such signaling information only occurs when the mobile device is conducting some type of communication with the radio network such as a voice call or data session. Less than 1% of locates are actively collected by sending location requests to a mobile device.

In all NELOS location records, there is no guarantee of the location being absolutely perfect. In fact no method of locating is ever perfect. Even a high accuracy land survey comes with information about likely errors. Geographical factors (i.e. proximity to a body of water) have impacted the radio network information from which NELOS calculates a position. We have observed areas in close proximity to towers where high signal strength masks out other radios needed for a triangulation, meaning NELOS cannot produce location records.

AT&T CDR

Current records are in UTC.
Older records are in switch time.

Run Date: 05/04/2015
Run Time: 11:29:17
Voice Usage For: (787)460[redacted]
Account Number: 5231[redacted]

Item	Conn. Date	Conn. Time (UTC)	Seizure Time	RT	Originating Number	Terminating Number	IMEI	IMSI	CT	Feature	Cell Location
1	04/07/15	06:26	0:04	0:13	1787664[redacted]	1787460[redacted]	35440406[redacted] APPLE IPHONE6	3104107[redacted]	MT	[NIOP]	[51992/35887:-66.080875:18.41488:355:65.0]
2	04/07/15	06:26	0:09	0:13	1787664[redacted]	1787460[redacted]		3104107[redacted]	ST	[NIOP]	
3	04/07/15	06:26	0:09	0:13	1787664[redacted]	1787460[redacted]			MO	[NIOR]	[]
4	04/07/15	08:41	0:11	0:07	1787460[redacted]	1787360[redacted]			MT	[NIOP]	[]
5	04/07/15	08:41	0:14	0:07	1787460[redacted] 01117873600642(D)	1787360[redacted]	35440406[redacted] APPLE IPHONE6	3104107[redacted]	MO	[NIOR]	[51996/04703:-67.1516667:18.4:205:65.0]
6	04/07/15	12:17	0:12	0:28	1787466[redacted]	1787460[redacted]	35440406[redacted] APPLE IPHONE6	3104107[redacted]	MT	[NIOP]	[51996/04703:-67.1516667:18.4:205:65.0]
7	04/07/15	12:17	0:16	0:28	17874667[redacted]	1787460[redacted]		3104107[redacted]	ST	[NIOP]	

Row number

Connection Date. Connection Time. The ring time for answered calls the time prior to answer: For answered calls, it is difference between call attempt and connection times. For unanswered calls, it is the time from attempt until disconnect. In the first case, attempt time + seizure = connection time. In the second case, call attempt time (which is same as connect time) + seizure time = disconnect time.

Duration of transaction in HH:MM

Number placing the call

Number called

International Mobile Equipment Identity

International Mobile Subscriber Identity. Subscriber number / identifier

Call type

Type of transaction

Provides the LAC/CID or 4G eCGI. Also provides the sector orientation and beam width information. *Lat/Long are provided for the towers at the time the report is generated.

AT&T CDR & Tower List

As of 8/2015, AT&T is sending current tower data within historical CDRs. For example, 2012 CDRs include 2015 tower information. Every tower needs to be verified. You must use the cell site database to get the towers for the correct timeframe.

CDR

Cell Location

Item	ConnDateTime	SeizureTime	OriginatingNumber	TerminatingNumber	ElapsedTime	NumberDialed	Description	Cell Location
1	03/29/14 02:16PM	0:21	1908458	1908555	0:00	1908555	M2M_DIR	03987,10782,-74.67389:40.50681,130
12	04/01/14 03:36PM	0:02	1908555	1908458	0:00	1908458	M2M_DIR	03987,10782,-74.67389:40.50681,130
13	04/01/14 03:44PM	0:09	1908555	1908458	2:05	1908458	M2M_DIR	03987,10782,-74.67389:40.50681,130

TOWERS

LAC **CID** **Sector Orientation**

Latitude	Longitude	LAC	CID	Tower_Heigh	Sector_It	Horizontal_Beamwidt	Sector_Orientatio
40.5068061	-74.6738889	3987	10782	150	B	65	130

Please refer to the legend below that explains the columns and the information displayed on the attached report.

LEGEND FOR AT&T MOBILITY RECORDS LABELED "DATA SOURCE: SCAMP"

The attached file is being sent in a text file format to provide you with the ability to download into your data analysis system.

Once downloaded into an EXCEL format, header information will appear at the top displaying the AT&T 6-digit file number, creation date, the AT&T database source, date the report was run, and the account number of the target.

You may receive up to 3 separate reports for usage: Voice, Data and SMS. This is indicated at the beginning of each report. The fields you will find on usage reports are as follows:

VOICE:
Conn. Date and Conn. Time: The date and time the call was actually connected.
Seizure Time: The number of minutes and seconds it took from the time the 'Send' button was pressed to the time the call was connected to the network.
Originating Number: If target number appears in this field, the call is an outgoing call and the called number is in the Terminating Number field.
Terminating Number: If target number appears in this field, the call is an incoming call and the caller's number is in the Originating Number field. In rare instances, you may see all *** in this column. This is an indication that an invalid number was entered.
Elapsed Time: Number of minutes and seconds of the call between the connection time and the end of the call, also known as call duration. Does not include seizure time.
Number Dialed: This column represents the number that was actually dialed by the calling party or the voicemail access number if the call was forwarded to voicemail.
IMEI: International Mobile Equipment Identification number.
IMSI: International Mobile Subscriber Identity number.
Description: This field uses 2 key characters that describe the parties involved and a short description suffix key word that describes what is known about how the call was handled. Outbound calls will always be described as "DIR". "M" indicates the presence of an AT&T Mobility number. "m" indicates the presence of another wireless carrier's number. The number "2" will always be shown in the middle of the two characters and is used in lieu of "to". For example, M2O means AT&T Mobile "to" a Non-Mobile Phone Number. This report will not show routing by the receiving side of an outbound call. The tables below describe the potential values.

Key Character Definitions

Field	Description
M	AT&T Mobile Phone (based on billing validation)
m	Other Carrier Mobile Phone (based on billing validation)
O	Non-Mobile Phone Number

Calls will have 4 potential "suffix" descriptions.

Description Suffix Definitions

Field Suffix	Description
DIR	Outbound calls will display DIR except for voicemail checks directly from the handset (VMC). Inbound calls will display DIR if no forwarding took place. Either the phone was answered or rang and was not answered.
VMC	Call was from handset to check Voicemail box.
VMB	Call was routed to VoiceMail number.
FWD	Call was forwarded to another number.
	Forwarding action could not be determined.

A call described as "m2M_DIR" would be interpreted as a call from another carrier's mobile phone to an AT&T mobile phone that was not forwarded. For example, the call was not routed to voicemail. A call described as "O2M_FWD" would be a call from a non-mobile phone number to an AT&T mobile number that was forwarded to the number listed in the Terminating Number field.
Cell Location: Column only displays if location information was requested. The first two numbers indicate the beginning and ending LAC/CID information followed by the longitude/latitude and the azimuth (center point of the sector) of all cell sites that serviced the call. If the target was traveling, you may see more than one cell site in this field which will indicates hand offs while the call is in progress.

DATA USAGE:
The Data report displays many of the same columns as on the other reports, but also includes:
Bytes Up: The number of bytes sent from mobile station to the network.
Bytes Dn: The number of bytes from the network to the mobile station.
Access Pt: Displays the network interface access point.
Cell Location: Column only displays if location information was requested. Same information is displayed as noted above.

AT&T Additional Notes:

- Can get CDRs for wearables. Get the IMSI for the wearable, then ask AT&T for the additional CDR based on that IMSI (the phone number will be different).


Sprint
TM

Sprint

Sprint Corporate Security
6480 Sprint Parkway
Overland Park, KS 66251

Contact Information:	
Electronic Surveillance (Surveillance, PTT, T-3s, GPS, 911, exigent)	(800) 877-7330 Fax (816) 600-3100
Subpoena Compliance (historic records, testimony) Compliance Questions: Scg-projects@Sprint.com	(800) 877-7330 Fax (816) 600-3111
Immediate Records Request (IRR)	(913) 315-8774 Fax (816) 600-3121
Ping Request	(913) 315-8805 Fax (816) 600-3100

Technology: CDMA & LTE

Sprint

How They Will Send Records	• Sprint will provide Microsoft Excel file(s) and email them to a secure law enforcement account, if requested • Records should be sent electronically • All requests can be made and received on Sprint's law enforcement portal (L-Site)
CDRs	• 18 months with Cell/Sector records • 'No charge', but fees may be incurred if the request is burdensome • CDR Backup tapes are available 2005-present. Cost: $300 for each day of records requested
CDRs (SMS)	• Can provide content, but a TIII is required. • Text (toll detail): 18-24 months (no tower info) • *"**Time Zones**: As of 06/04/2018, text message time stamps are in GMT. Please be advised that between 06/01/2017 and 05/31/2018, text message time stamps may be in GMT if the NEID is in the range 540-559 or, Central time zone for all others. From October 12, 2010 through May of 2017 text message time stamps were kept in Central time zone. Records prior to October 12, 2010 are either in Central or Eastern time zone. Sprint is unable to determine which time zone is reflected in records older than October 12, 2010. "*

Sprint

Cost Per Pen Register	• Implementation: $400 per market, but the price is capped at $2,000 (not charged again if extension is made prior to termination) • Maintenance fee: $10 per day with no cap
Phrase to use in historical records orders/warrants	• "All available call detail records to include voice, SMS detail, data sessions, per call measurement data (PCMD), cell site and cell site sector information from (date) to present"
Calls to Destinations Search	• Data held for 18 months • Cost- Depends on how it is billed. Cost could be $50 flat fee or $30 per hour of research • Legal Threshold- Subpoena
IP Data Sessions	• To get cell and sector info, request the following: • "....all data connection logs to include cell sites, or location information....." • Sprint cannot currently translate IPV4 addresses (ex. 152.138.17.240) to an actual phone number • Sprint may be able to translate IPV6 addresses (ex. 001:0db8:0000:0042:0000:8a2e:0370:7334) to a phone number

Engineering Data Sets/ Location Based Services

GPS PING	• If not set up through L-Site, cost is $20 per manual request • Alpha (Assisted) GPS: Silent Call-location, Update based on satellite, Read on GPS • Hybrid GPS: Combo of 1 or 2 satellites and towers • AFLT: Advanced Forward Link Trilateration
L-Site "PING"	• $30 flat fee per month on L-Site • Can set up your own pings, receive info faster than manual requests • Lat/Long coordinate of phone and radius of uncertainty • Pings can occur every 15 mins for 30 days, or every 5 minutes if set up manually
Reveal (PCMD)	• Provides estimated device location using a Round Trip Delay measurement from the tower. It IS NOT a GPS location of the device. • Available for approx. 2 weeks for data, and approx. 90 days for voice and SMS traffic. • Time stamps are based on switch time. Sprint does not testify to the accuracy of these reports.

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Key to Understanding PCMD Reports

Phone Number:	Target phone number
ESN:	Serial number assigned to the device
Call Start Time:	Date and time the mobile device first registers with the Sprint network
Duration (seconds):	Length of the mobile device activity
Vendor:	Company which provides network services to Sprint cell sites
Call Type:	Type of connection. These include 1X Data, EVDO, LTE, SMS, or Voice
Latitude:	Estimated latitude from the Round Trip Delay (RTD)
Longitude:	Estimated longitude from the Round Trip Delay (RTD)
Distance (In Miles):	Estimated distance in miles that the device is from the main cell site
Confidence:	Level of reliability used to estimate Latitude and Longitude
Primary Cascade:	The main cell site used during mobile device activity
Primary Sector:	The side of the main cell site used by the mobile device
Second Cascade:	The second cell site with which the mobile device was registered (Not on 90-day Voice Report)
Second Sector:	Side of the 2nd cell site with which the mobile device registered (Not on 90-day Voice Report)
Third Cascade:	The third cell site with which the mobile device was registered (Not on 90-day Voice Report)
Third Sector:	Side of the 3rd cell site with which the mobile device registered (Not on 90-day Voice Report)
BAN:	The subscriber account number

How Latitude and Longitude are determined: A cell site sends a Radio Frequency (RF) to measure the distance to and from the mobile device back to the cell site. This is called Round Trip Delay (RTD) and determines location. Accuracy can be affected by buildings, repeaters, topography, weather etc.

How timestamps are determined: All timestamps for Voice, SMS (text), EVDO and 1X Data are in local time. LTE timestamps may vary by vendor vary as follows: **Samsung or Lucent:** GMT or Local. **Nortel:** GMT

How confidence is determined: Accuracy is determined by the number of cell sites the mobile device uses. The use of three cell sites produces a higher confidence level than the use of 1 or 2 cell sites. GPS may increase confidence levels.

Be advised, Sprint will not guarantee the accuracy of PCMD location information. The Sprint Trial Team will not testify on PCMD accuracy or records

Sprint CDRs: Lucent vs Nortel

Lucent

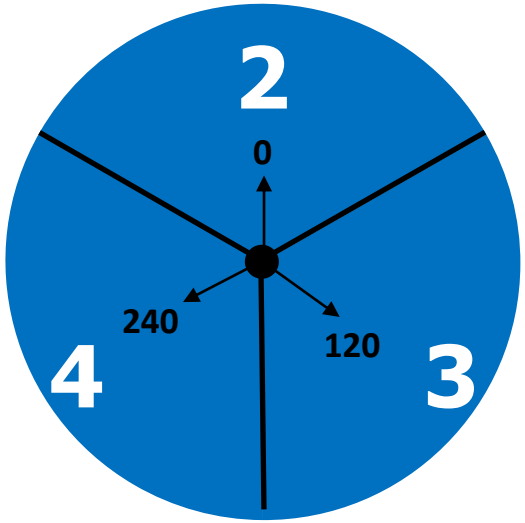
"lose the 1"

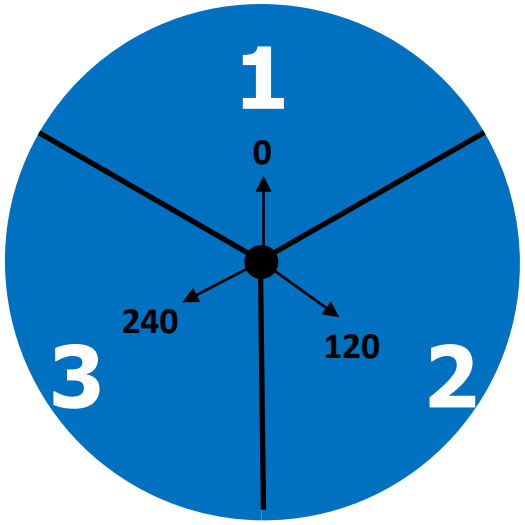
2 Alpha
3 Beta
4 Gamma

* Remember that cell sector orientations may vary tremendously depending upon your location. For that reason, you must check your tower list to determine the actual sector orientations for a tower.

Nortel

1 Alpha
2 Beta
3 Gamma





The Lucent rule applies to CDRs, not tower lists

Sprint Call Detail Record

CALLING_NBR	CALLED_NBR	DIALED_DIGITS	M_R_#	START_DATE	END_DATE	DURATION (SEC)	NEID	REPOLL_#	1ST CELL	LAST CELL
(401) 602-	(401) 954-		Inbound	10/20/14 9:05:14	10/20/14 9:05:14	0	192	295	0	0
(401) 954-	(401) 602-		Outbound	10/20/14 9:06:30	10/20/14 9:06:30	0	195	517	0	0
(401) 954-	(401) 602-		Outbound	10/20/14 9:16:17	10/20/14 9:16:17	0	197	522	0	0
(401) 602-	(6245000) 0(	(401) 954-	Routed_Call	10/20/14 9:32:34	10/20/14 9:32:38	4	101	247	20286	20286
(401) 954-	(401) 602-	(401) 602-	Outbound	10/20/14 9:32:45	10/20/14 9:33:33	48	101	247	20286	20286
(401) 954-	(401) 741-		Outbound	10/20/14 9:38:18	10/20/14 9:38:18	0	196	294	0	0
(401) 741-	(401) 954-		Inbound	10/20/14 9:42:29	10/20/14 9:42:29	0	192	508	0	0
(401) 954-	(401) 741-		Outbound	10/20/14 9:42:50	10/20/14 9:42:50	0	197	532	0	0
(401) 419-	(401) 954-	(401) 954-	Inbound	10/20/14 9:49:52	10/20/14 9:50:16	24	101	247	20286	20286
(401) 954-	(401) 741-	741-54	Outbound	10/20/14 9:56:04	10/20/14 9:56:35	31	101	247	20286	20286
(401) 602-	(401) 954-	(401) 954-	Inbound	10/20/14 9:58:46	10/20/14 9:59:26	40	101	247	20286	20286

placing (initiating) the call

actually called

Digits that the caller enters into the keypad of the phone

Mobile Role (Type of Call). Listed as outgoing, incoming, routed call or undetermined

Date and time the call was initiated

Date and time the call ended

Duration of call, in seconds

This reflects which network element handled the call

This reflects which switch handled the call

Specific cell site in which the call was initiated. The first digit reflects the sector. The last 4 digits represent the site number

Specific cell site in which the call was ended. The first digit reflects the sector. The last 4 digits represent the site number

Sprint CDR & Tower List

Sprint

Remember in the SPRINT CDR's the "1st Cell" contains both the sector and the Cell #. The first digit is the sector and the remaining digits are the Cell #

CDR

NEID

1st Cell

CALLING_NBR	CALLED_NBR	DIALED_DIGITS	M_R #	START_DATE	END_DATE	DURATION (SEC)	NEID	REPOLL_#	1ST CELL	LAST CELL
(908) 444-	(908) 555-	(908) 555-	Incoming	4/30/14 21:56:53	4/30/14 21:57:17	24	106	425	40101	40101
(908) 555-	(201) 306-	(201) 306-	Outgoing	4/30/14 22:18:11	4/30/14 22:19:48	97	106	425	40101	40101
(908) 555-	(201) 306-	(201) 306-	Outgoing	4/30/14 22:21:47	4/30/14 22:22:16	29	106	425	40101	40101

TOWERS

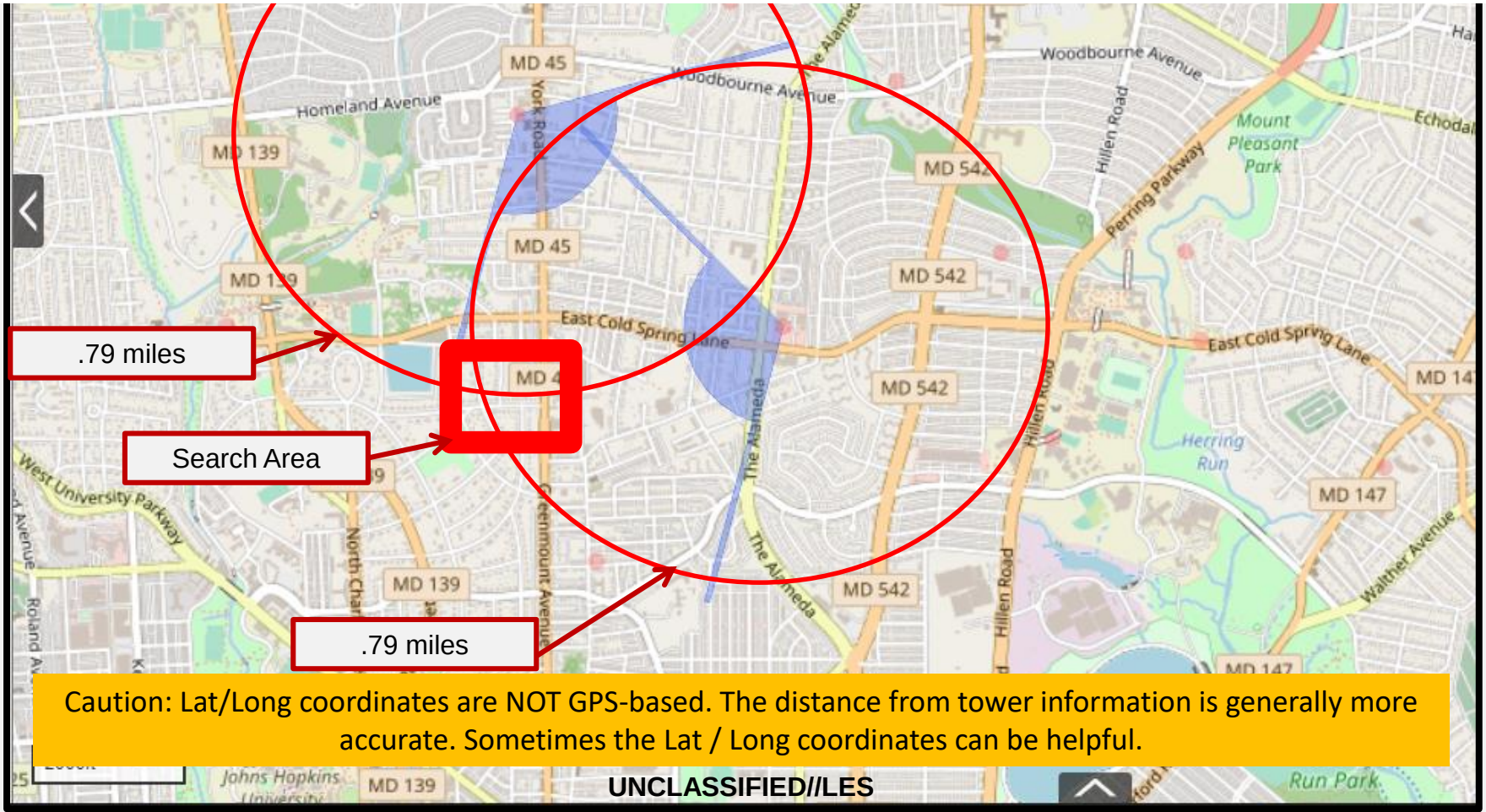
Cell #

NEID

Cell#	Cascade ID	Switch	NEID	Repoll#	Latitude	Longitude	BTS Manufacturer	Sector	Azimuth	CDR Status
101	NY03XC115	NY-BRANCHBURG 1	106	425	40.567777	-74.608833	Lucent	3	304	Active

Engineering Data: PCMD (Per Call Measurement Data)

- By using the data transfer rate between the cellular device and the tower, the cellular provider can approximate the signal distance between the tower and the cellular device using a Round Trip Delay measurement from the tower.
- Time stamps are based on switch time.
- Sprint does not testify to the accuracy of these reports.
- Available for approx. 2 weeks for data and SMS traffic, and approx. 90 days for voice traffic.



Caution: Lat/Long coordinates are NOT GPS-based. The distance from tower information is generally more accurate. Sometimes the Lat / Long coordinates can be helpful.

CDR and PCMD

CDR

NEID

1st Cell

CALLING_NBR	CALLED_NBR	DIALED_DIGITS	M_R_#	START_DATE	END_DATE	DURATION (SEC)	NEID	REPOLL_#	1ST CELL	LAST CELL
(732) 289-	(908) 220-	(908) 220-	Inbound	4/25/14 22:40:23	4/25/14 22:40:48	25	106	425	30340	30340
(732) 289-	(908) 220-	(908) 220-	Inbound	4/25/14 22:47:34	4/25/14 22:47:59	25	106	425	30340	30340
(732) 289-	(908) 220-	(908) 220-	Inbound	4/25/14 23:07:06	4/25/14 23:07:31	25	106	425	40145	40145

1

PCMD

Switch

Cell #

Distance

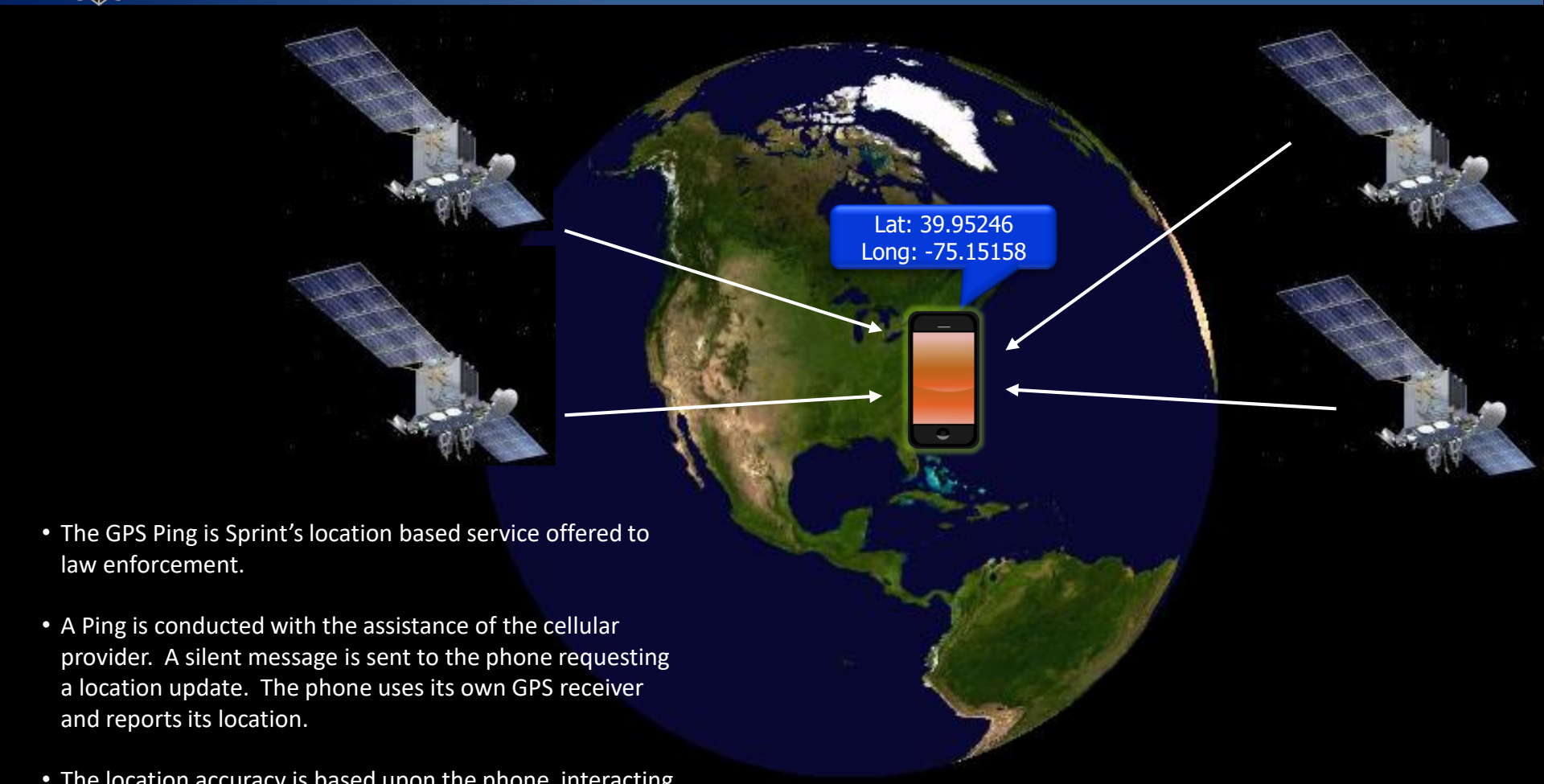
PHONE NUMBER	ESN	CALL START TIME	DURATION (SEC)	SWITCH	CELL ID	SECTOR	DISTANCE (In Miles)	LATITUDE	LONGITUDE	CASCADE	CALL TYPE	SITEID
(908) 220-2998	a000004125335e	4/25/14 10:40:39 PM	26	BBTPNJBR-MSCE-1	340	2	1.60	40.48854091	-74.48373654	NY62XC301	Unknown 1X	81348
(908) 220-2998	a000004125335e	4/25/14 10:47:49 PM	26	BBTPNJBR-MSCE-1	340	2	1.64	40.50623386	-74.475379	NY62XC301	Unknown 1X	81348
(908) 220-2998	a000004125335e	4/25/14 11:07:21 PM	26	BBTPNJBR-MSCE-1	145	3	1.07	40.49182642	-74.48491878	NY03XC083	Unknown 1X	18938

2

Notice that the CDRs reflect sectors as 3 and 4, but the PCMD reflect sectors as 2 and 3. Lucent rules only apply to CDRs (not PCMD)

PCMD
Sample Mapping

Ping



- The GPS Ping is Sprint's location based service offered to law enforcement.
- A Ping is conducted with the assistance of the cellular provider. A silent message is sent to the phone requesting a location update. The phone uses its own GPS receiver and reports its location.
- The location accuracy is based upon the phone interacting with a minimum of 4 satellites (3 without altitude).

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Key to Understanding CDMA Call Detail Reports

Calling number: This column reflects the number placing the call (the individual who initiated the call). If the call is an outgoing call, this will be the Sprint PCS target number.

Called number: This column reflects the number actually called. In most cases this number will be the same as the number in the "Dialed Digits" column. If the number has been forwarded, or if there is a routing number, then this will be reflected. If the number has a 11 in front of the area code, that means the call rolled to voicemail and was NOT answered by the customer.

Dialed digits: This column reflects the digits that the caller enters into the keypad of the phone. If the call is an incoming call, this will be the Sprint PCS target number.

Mobile Role: Mobile Role (Type of Call). Listed as outgoing, incoming, routed call or undetermined.

Start Date: Date and time the call was initiated.

End Date: Date and time the call was ended.

Duration: Duration of call, in seconds.

Call Type: Indicates the type of transaction on the network. This includes, but not limited to: Voice, Text Detail, WiFi and Airave.

NEID: This reflects which network element handled the call.

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Key to Understanding CDMA Call Detail Reports, cont.

*Routed calls come in several varieties. A TLDN (Temporary Local Directory Number) may be considered to be a bridge/router number to complete a call. A TLDN will be represented by a number that may range from 3 to 10 digits in length. Similar to TLDN, an IMRN (IP Multimedia Routing Number), will be used to route Apple WiFi Calls. Another scenario is when a call is not answered, but is routed to voicemail. Calls routed straight to voicemail may also have an "11" before the number indicated in the "Called_Nbr" column. For handsets using visual voicemail, these numbers may replace the "11" in the called number column: (800) 877-2400, (866) 677-8204, (866) 222-2604, and (877) 836-4746 The indicator that Sprint's Visual Voicemail platform was used within the session appears as 624500000XXXXXXX.

*WiFi Call Type: Please note that Sprint does not have the capability to determine the time stamp. These calls can be reflected in Switch time or GMT.

*The CDMA call detail report may indicate the sending and receipt of text messages and e-mail. While not flagged as text messages, the line will indicate no duration, the dialed digits column will either be blank or will show an e-mail address, and the NEID column may contain one of the following numbers: 191-198 226-229 291-294

* On the CDMA network, Sprint maintains Gateway, SWATs (Soft Wireless Access Tandem) and MCGs (Media Gateway Controllers) networks in areas where there are large Sprint customer populations. These provide the required extra space that helps Sprint maintain all of the calls. When a call moves through a gateway or SWAT cell site information is not retained and is not recoverable. NEIDs for Gateways 124-125, SWATs are 96, 184-190, 263, 363-365 and MGCs are 366-371

Time Zones: As of 06/04/2018, text message time stamps are in GMT. Please be advised that between 06/01/2017 and 05/31/2018, text message time stamps may be in GMT if the NEID is in the range 540-559 or, Central time zone for all others. From October 12, 2010 through May of 2017 text message time stamps were kept in Central time zone. Records prior to October 12, 2010 are either in Central or Eastern time zone. Sprint is unable to determine which time zone is reflected in records older than October 12, 2010.

*Please be advised: The time stamp reflected on call detail reports for Sprint CDMA during the time frame of 02/04/2018 through 02/28/2018 may have been affected by a storage related upgrade. During this period, transactions may be reflected in GMT instead of the time stamp native to the switch utilized in the transaction. This includes, but is not limited to, Voice calls and SMS transactions.

Key to Understanding CDMA Call Detail Reports, cont.

*Short codes, also known as short numbers, are special telephone codes, significantly shorter than full telephone numbers, which can also be used to address SMS and MMS messages from mobile phones or fixed phones. Short codes are often associated with automated services. An automated program can handle the response and typically requires the sender to start the message with a command word or prefix. A list of short codes is not maintained by Sprint as number of short codes is extensive and constantly growing. Example of a short code- the customer may want updates pertaining to their favorite sports team. The customer would sign up with that team in order to receive text message updates relevant to the team.

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Star Codes

Your request has been fulfilled, at least in part, by what is known as a CDMA CDR Report. A CDMA CDR Report lists information about incoming/outgoing calls including the digits dialed on the handset. As a dialing shortcut, PCS subscribers may use star codes (an asterisk (*) plus a short number sequence) when using our wireless telephones. On call detail reports the star may be indicated by a letter "B". This code will appear in the dialed digits column of the CDMA CDR Report. Following is a list of the most common star codes. Additional star codes may exist in the market from which the call is made. Please contact the Subpoena Compliance Group at the number listed above for more information concerning star codes.

*18 - Ping the nearest tower, call delivery activate
*180 - Call delivery deactivate
*2 - Customer Care
*3 - Payment Center
*31 - Three Way Calling
*4 - Account information
*5 - Spanish Customer care
*67 - Caller ID block
*68 - Override caller ID block
*70 - Cancel call waiting for that call
*711 - Customer Care
*72 - Activates call forwarding
*720 - Deactivates call forwarding
*73 - Call forwarding no answer
*74 - Call forward busy
*811 - Customer Care
*82 - Override caller ID block- for that call
*911 - 911
*073 - Cancel call forward no answer
*074 - Cancel call forward busy

<u>Other numbers which may appear in the dialed digits column</u>:

411 - Directory assistance

611 - Customer Care
711 - Telecommunications Relay Service (hearing impaired)
911 - Can also dial 0911 or 1911)
c777 - Web Browsing (SINS)

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RECEIVING RECORDS IN ELECTRONIC FORMAT

Your request has been satisfied, at least in part, by records furnished on compact disc (CD) or via e-mail. Sprint uses CDs when the response is particularly voluminous or if records are requested in electronic format. Once "recorded" the CD cannot be deleted, re-recorded or appended. Information on CD is normally in one of three formats:

RICH TEXT FORMAT (RTF)

These files are text files readable by any word processor such as Microsoft Word/Works or WordPerfect. Generally, we use this format for letters, summaries and explanatory documents. To retrieve these documents, open your word processor of choice then use the open file command (normally listed under File in the Window Menu bar). Navigate to the drive containing the CD and double click on the file name. While you may not manipulate the file and re-save directly on the CD, it may be manipulated and re-saved elsewhere.

SPREADSHEET FILES (XLS or CSV)

These files are normally used for longer items such as the call detail reports or a listing of all cell sites associated with a particular switch/repoll. We use Microsoft Excel to generate these files and recommend that product for viewing them. To retrieve these documents, open your spreadsheet program of choice then use the open file command (normally listed under File in the Window Menu bar). Navigate to the drive containing the CD and double click on the file name. These files may be uploaded to products such as PenLink in either CSV or XLS format. Please see your program documentation for assistance. While you may not manipulate the file and re-save directly on the CD, it may be manipulated and re-saved elsewhere.

TAGGED IMAGE FORMAT (TIF or TIFF)

This format is used for stored bills and for print outs from our customer service/billing system. All Windows based machines come with TIF viewers but accessing the viewer software may be unfamiliar. To retrieve these documents, open the My Computer folder on your desktop or Open the Windows Explorer (not Internet Explorer). Navigate to the drive containing the CD and RIGHT click on the file name. This will open a menu. Choose "OPEN WITH." A new dialog box will open. Look for applications that do Imaging. The most common are "Imaging", "Imaging Preview", "Microsoft Imaging", "Kodak Imaging" and Microsoft Office Document Imaging." Single click on your choice and also click on the check box which says, "Always use this program to open these files." This will set the program as your default and next time you need to open a TIF file, you may just double click on the desired document. Once open, most TIF viewers only display the current page. To go to the next page, use the page up/down keys on your computer keyboard or look for helper arrows. You may also wish to peruse the Help feature offered in every Windows based program. Please note: these files may not normally be uploaded to products such as PenLink since they are not open for manipulation. Please see your program documentation for assistance.


T · ·Mobile·

T-Mobile

Address:	T-Mobile Law Enforcement Relations Group 4 Sylvan Way Parsippany, NJ 07054

Contact Information:	
Law Enforcement Relations Group	(973) 292-8911
Fax	(973) 292-8697
Email	LERcourtorders@t-mobile.com

* On 5/13/2013, MetroPCS merged with T-Mobile. Contact T-Mobile for all MetroPCS requests

Technology: GSM (2.5G), UMTS, LTE

T-Mobile

Available Information	• With subpoena: subscriber, tolls, store video, device and payment info • With court order: pen registers (no location) • With search warrant: everything above, historic & real-time location, voicemail, customer notes/memos, wiretap • Wifi may not show up on CDRs because they do not go through the cellular network
Length of Time Call Detail Records are Maintained	• Pre-paid accounts: 2 years from present date • Post-paid accounts: since account was opened
SMS Records	• Billed information is available - i.e. date and time stamp of the text message • No text message content is stored or available • Provides call and text tower/sector info
Location Based Services	• Assisted GPS ("WebMap") to provide real-time, approximate location, $51 per day • Note the sector orientation on towers can be very different, therefore, it is important to import sector, and sector orientation on historical location information • WebMap will send an email at a desired time with lat/long & radius of uncertainty

T-Mobile

Engineering Data Sets	• Timing Advance/TDOA ("TrueCall"): T-Mobile historic location based service • Includes data registrations not just calls
Pen Registers	• $200 set-up fee and $20 per day maintenance with a minimum fee of $500 • No extension fee if authorization provided prior to takedown
IP Data Sessions	• Cannot currently translate IPV4 addresses (ex. 152.138.17.240) to an actual phone number • Can translate IPV6 addresses (example 0001:0db8:0000:0042:0000:8a2e:0370:7334) to a phone number
Calls to Destinations Search	• Yes • No current cost for Calls to Destination search • Legal threshold - Subpoena or higher
Exigent Circumstances	• Use the T-Mobile form or call them and indicate that you have an exigent circumstance. Then fax/email with agency letterhead. Exigent circumstances are generally honored for up to 48 hours.

T-Mobile

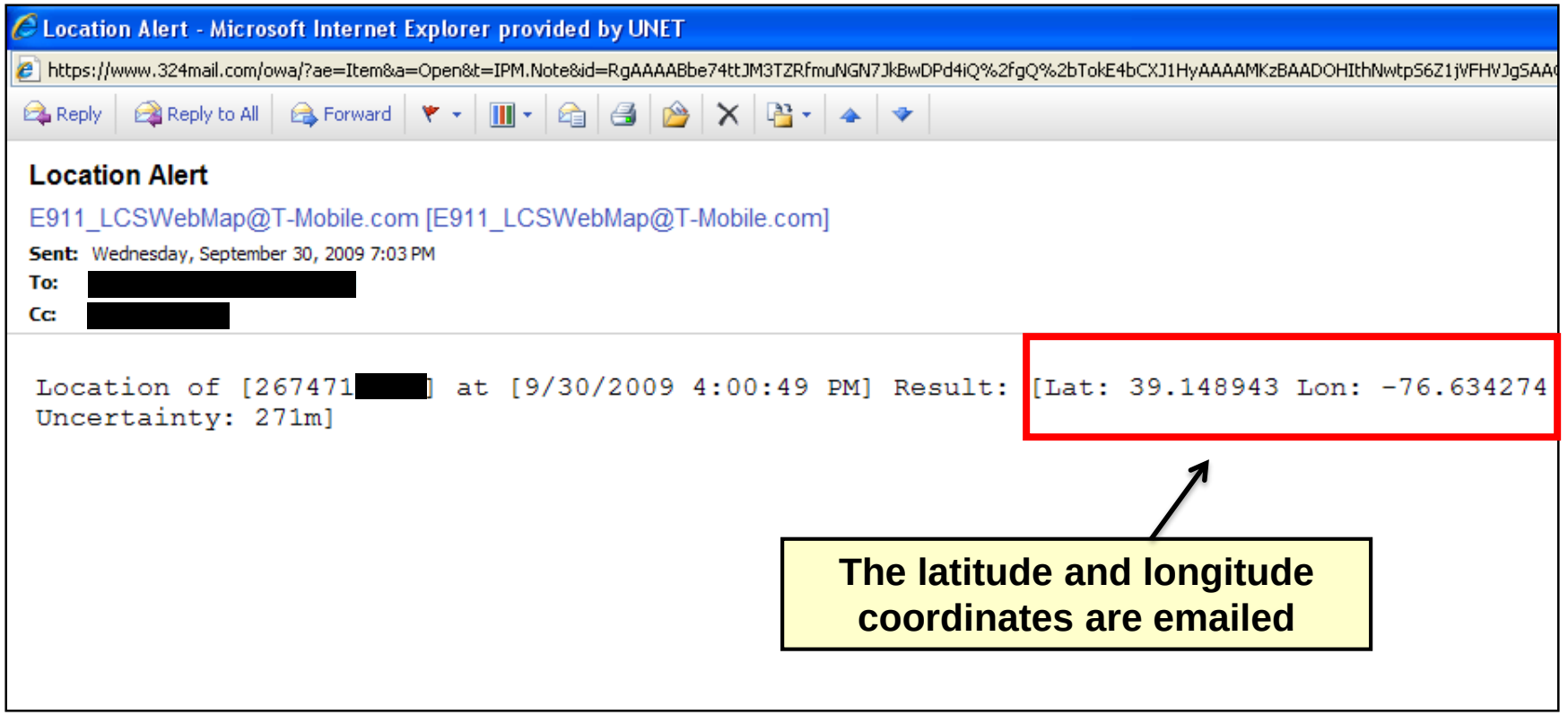
Phrase to use in court orders/search warrants for T-Mobile E-911/GPS/Geo Locator:

"Such service provider shall initiate a signal to determine the location of the subject's mobile device on the service provider's network or with such other reference points as may be reasonably available and at such intervals and times as directed by the law enforcement agent serving this order"

All legal demands should include the following:

- Issued to or Commanded to search T-Mobile
- Signature of legal authority who issued demand
- Signature Date
- Target to be searched
- Date Range
- Specific list of record(s) requesting
- Return Information (fax, address, e-mail)

T-Mobile E-911 Locator Email Sample



* Note these are typically in Pacific time. When using E-911 Locator, verify the timestamp.

T-Mobile E-911 Responses

Response 1	• Location of [target phone #] date, time and lat / long and uncertainty **i.e. Location of [2157081214] at [6/04/2008 9:30:32 AM]** **Result: [Lat:39.937835 Lon: -75.177705 Uncertainty 443m]**
Response 2	• [Absent_Subscriber] – phone is not on the network
Response 3	• [Position_Method_ Failure] – phone is powered off or has moved into an area where switch is not provisioned ****If you see this – it may come back on****
Response 4	• [Internal_ Error] – phone is on but roaming on another network
Response 5	• [System_ Failure] – phone has gone off network

T-Mobile CDR

T-Mobile Mediation Reports

Information Provided To: **T-Mobile US, Inc.**

Agency:
Requestor:
Agent Address:
Billing City, State, Zip:
Provided On:

Request Submission Response

This is in response to your Search Warrant , 10562 dated Jan 08,2016 which was served upon T-Mobile US, Inc. You have requested Information for the subscriber associated with MSISDN: 4153751078. All times below are reflected in Coordinated Universal Time (UTC).

Date	Time	Duration	Call Type	Direction	Calling Number	Dialed Number	Called Number	Destination Number	IMSI	IMEI	Completion Code	Answered?
8/2/2015	00:57:46	4	callForwarding	Outgoing	479320	1805637	1805637	180563	3102606864		Completed Successfully	Answered
8/2/2015	00:58:02	2	callForwarding	Outgoing	479320	1805637	1805637	180563	3102606864		Completed Successfully	Answered
8/2/2015	02:05:44	60	mSTerminatingSMSinMSC	Incoming	122		1415375		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	02:05:45	60	mSTerminatingSMSinMSC	Incoming	129		1415375		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	02:05:46	60	mSOriginatingSMSinMSC	Outgoing	141537		122		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	02:06:09	60	mSTerminatingSMSinMSC	Incoming	129		1415375		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	04:24:33	60	mSTerminatingSMSinMSC	Incoming	122		1415375		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	04:24:35	60	mSOriginatingSMSinMSC	Outgoing	141537		122		3102606864	1406700309	Completed Successfully	Answered
8/2/2015	04:24:40	60	mSTerminatingS	Incoming	129		1415375		3102606864	1406700309	Completed Successfully	Answered

T-Mobile CDR

Interpreting Call Detail

Your response includes Call Detail Records (CDR) either with or without location. Our query results in an Excel file with multiple columns. Each row represents one call on the T-Mobile network. Some fields only appear in reports with location information.

Multimedia Messages (MMS) and text messages sent as MMS do not appear as part of a call record. Standard text messages do appear on this report. Calls made while roaming also do not appear on this report.

Please remember that T-Mobile CDR systems natively use Coordinated Universal Time (UTC). By default, that means a day of call detail records are taken from 00:00:01 to 23:59:59 UTC which may differ from your intended time range due to your time zone. If specific times other than our default are important to your inquiry, please submit legal demands with the date range/time frame adjusted for UTC to avoid delay or confusion. We are unable to convert the time displayed in the records to the local time of the handset.

The columns present on your CDR may be:

COLUMN NAME	DESCRIPTION	LOCATION RPT ONLY?	NOTES
Date	Date format mm/dd/yyyy	NO	
(UTC) Time	24 hour time format - hh:mm:ss in UTC	NO	In UTC time
Duration	Duration in seconds. For SMS transactions, duration is irrelevant but may show as 60 seconds.	NO	
Call Type	Type of call: callForwarding = Forwarded Call; mSOriginating = Outgoing Voice Call; mSTerminating = Incoming Voice; mSOriginatingSMSinMSC = Outgoing SMS; mSTerminatingSMSinMSC = Incoming SMS	NO	
Direction	Outgoing or Incoming to the target telephone number	NO	
Calling Number	Phone number that initiated the call	NO	
Dialed Number	Dialed digits	NO	
Called Number	Phone number that received the call	NO	
Destination Number	The final destination number to which the network has connected the call (might be different from the one dialed by subscriber if network translation was applied)	NO	
IMSI	International Mobile Subscriber Identity of the target number, if present	NO	
IMEI	International Mobile Equipment Identity of the target number, if present	NO	
Completion Code	Completed successfully or Abnormal Completion (network interruption). Abnormal completion calls display on this report but may or may not show on a customer's bill.	NO	
Answered?	Answered or Unanswered. Unanswered calls display on this report but may or may not show on a customer's bill.	NO	
Service Code	11 Calling line identification presentation 12 Calling line identification restriction 13 Connected Line ID Presentation 20 All Call Forwarding Services 21 Call Forwarding Unconditional (CFU) 28 All Cond Call Forwarding Services 29 Call Forwarding on Mobile Subscriber Busy (CFB) 2A Call Forwarding on No Reply (CFNRy) 2B Call Forwarding on Not Reachable (CFNRc) 31 Explicit Call Transfer (ECT) 42 Call Hold 41 Call waiting 51 Multi-Party (MPTY)	NO	
Disconnecting Party	Calling Party; Called Party or Network	NO	
Service Indicator	If populated, then the call was originated on WIFI/VoLTE, and has continued on GSM (expect 2 CDRs for same call leg)	NO	
SMS Deliv Status	SMS delivery result	NO	

Switch Name	Name of the switch which was used to deliver the call to the target number.	NO	This is NOT an indication of the location of the device.
1st LTE Site ID	EnodeBid value in decimal	YES	Only present if the call was over LTE
1st LAC	1st LAC value in decimal	YES	Not present if the call was over LTE
1st Cell ID	1st Cell Site ID value in decimal	YES	Not present if the call was over LTE
1st Tower Azimuth	Location: Azimuth orientation of antenna serving user if available (see note below)	YES	
1st Tower LAT	Latitude of 1st cell tower used.	YES	
1st Tower LONG	Longitude of 1st cell tower used.	YES	
1st Tower Address	Street Address of the 1st serving tower if available	YES	
1st Tower City	City of the 1st serving tower if available	YES	
1st Tower State	State of the 1st serving tower if available	YES	
1st Tower Zip	ZIP of the 1st serving tower if available	YES	
Last LTE Site ID	EnodeBid value in decimal	YES	Only present if the call was over LTE
Last LAC ID	Last LAC value in decimal	YES	Not present if the call was over LTE
Last Cell ID	Last Cell Site ID value in decimal	YES	Not present if the call was over LTE
Last Tower Azimuth	Azimuth orientation of antenna serving user if available (see note below)	YES	
Last Tower LAT	Latitude of last cell tower used.	YES	
Last Tower LONG	Longitude of last cell tower used.	YES	
Last Tower Address	Street Address of the last serving tower if available	YES	
Last Tower City	City of the last serving tower if available	YES	
Last Tower State	State of the last serving tower if available	YES	
Last Tower Zip	ZIP of the last serving tower if available	YES	

A NOTE ON AZIMUTH: The azimuth listed is the center compass degree facing of the identified sector of the tower. Generally, the coverage of a tower is circular and divided in three equal pieces (each 120 degrees wide). Due north is 0, due south is 180. However, not every tower is aligned with the first sector starting at 0. Using the listed azimuth, rough direction from the tower can be calculated for a call. The center degree of the sector's facing is indicated in this field. For example, if a facing has a listed orientation of 90, the center of the coverage is pointed at 90 degrees but the sector will cover traffic from roughly 60 degrees on either side (thus 30 to 150 degrees in this example).

For more information on UTC, please visit: http://www.timeanddate.com/time/aboututc.html. To convert records to your local time, you will need to use a converter such as http://www.worldtimeserver.com/convert_time_in_UTC.aspx.

T-Mobile CDR- Data Sessions

Column Name	Description
apn	Access Point Name - name of a gateway between a GPRS, 3G or 4G mobile network and another computer network, frequently the public Internet.
cft_id	Contains a single entry for every combination of Cause for Termination Code(s) for each equipment vendor that supplies a data feed.
cft_description	A free form text description of the CFT ID meaning.
cell_sector_cell_id_sac	This value represents the GSM/UMTS cell sector cell ID. It is derived from the binary encoded value found in the column named **user_location_info**. If the first 2 digits of the user_location_info are 01 or 02, then 4 digits starting from the 13th digit of the user location number are converted from hexadecimal number to decimal format.
charging_characteristics	Lists the charging characteristics applied to the PDP context by the PGW.
charging_characteristics_sel_mod	This field specifies how the Charging Characteristics were selected Supported values are servingNodeSupplied (0), homeDefault (3), roamingDefault (4), visitingDefault (5).
charging_ident	This field contains a charging identifier.
dynamic_address_flag	This field indicates that the PDN address has been dynamically allocated for that particular connection.
pdn_gateway_addr	The IP Address of the GGSN or PGW.
cell_sector_lac	This value represents the GSM/UMTS cell sector LAC. It is derived from the binary encoded value found in the column named **user_location_info**. If the first 2 digits of the user_location_info are 01 or 02, then 4 digits starting from the 9th digit of the user location number are converted from hexadecimal number to decimal format.
node	The alpha numeric name of a Node.
pdp_type	This field defines the bearer type (IPv4 or IPv6). Possible values: 1 = IPv4, 2 = IPv6, 3 = IPv4/IPv6.
plmn_mcc	The Mobile Country Code of the network element handling this call.
plmn_mnc	The Mobile Network Code of the network element handling this call.
rat	Radio Access Technology. Possible values are: 2 - 2G GSM 1 - 3G/4G (UMTS/HSPA) 4 - GAN/UMA 6 - LTE 3 - WLAN 5 - HSPA Evolution
start_date	The date and time in UTC when the session was connected.
end_date	The date and time in UTC when the session was terminated.
tz_offset	The time zone offset from UTC.
record_seq_num	A running sequence number within the range of 1 to 4294967296 used to link partial records generated by the PGW for a specific IP-CAN bearer context (characterized with the same Charging ID and PGW address).
record_type	The expected values for the record type column are: PGW = 85; SGSN = 18
imei	International Mobile Equipment Identity, right trimmed to 14 digits (no check digit).
msisdn	Mobile Station International Subscriber Directory Number (mobile number)
imsi	International Mobile Subscriber Identity.
served_pdp_address	This field contains the IP address for the PDN connection.
srv_gateway_addr	Serving Gateway Address (this column is usually blank).
tac	First 8 digits of the IMEI.
feed_detail	A unique number assigned to each feed (this column is usually a 1, no further info available).
cell_sector_market	The Market served by the cell sector.
cell_sector_region	The Region served by the cell sector.
user_location_type	This field indicates cell sector details used by the UE (possible values are SAI, TAI, RAI, CGI, ECGI, TAI+ECGI). These are the usual values seen: SAI or CGI which are associated with GSM/UMTS sectors. TAI+ECGI which is associated with LTE sectors.
user_location_info	This field contains a binary encoded value indicating the details of the cell sector used.
cell_sector_tracking_area_code	This value represents the LTE cell sector tracking area code. It is derived from the binary encoded value found in the column named **user_location_info**. If the first 2 digits of the user_location_info are 18, then 4 digits starting from the 9th digit of the user location number are converted from hexadecimal number to decimal format.
cell_sector_enodeb	This value represents the LTE cell sector enodeb. It is derived from the binary encoded value found in the column named **user_location_info**. If the first 2 digits of the user_location_info are 18, then 5 digits starting from the 20th digit of the user location number are converted from hexadecimal number to decimal format.
cell_sector_ecgi_cellid	This value represents the LTE cell sector ecgi cell id. It is derived from the binary encoded value found in the column named **user_location_info**. If the first 2 digits of the user_location_info are 18, then 2 digits starting from the 25th digit of the user location number are converted from hexadecimal number to decimal format.
data_session_duration	The time duration in seconds derived by subtracting the start_date from the end_date.
data_session_upload_size	Summation of the data uplink size in bytes per session.
data_session_downlink_size	Summation of the data downlink size in bytes per session.

T-Mobile CDR & Tower List

- Each cell tower and cell site sector has a unique Cell ID that is like a fingerprint and is not repeated anywhere in the network

CDR

Location Area Code | **Cell ID** | **Tower Azimuth**

T	U	V	W	X
1st LAC	1st Cell ID	1st Tower Azimuth	1st Tower LAT	1st Tower LONG
40482	*1241*	*20*	*37.779077*	*-122.431835*
40482	*1241*	*20*	*37.779077*	*-122.431835*
40482	*1241*	*20*	*37.779077*	*-122.431835*

TOWERS

spbldrom_code	Sector	MNC	LAC	Cell_id	Orientation	horiz_bw	Lat_decimal	Lon_decimal
SF03024A	12UPA	260	40482	1241	20		37.779077	-122.431835

Location Area Code | **Cell_ID** | **Orientation**

You Must Use a Tower List From The Time The Crime Occurred

T-Mobile CDR & Tower List

- Each cell tower and cell site sector has a unique Cell ID that is like a fingerprint and is not repeated anywhere in the network

CDR

1st LTE Site ID

1st Tower Azimuth

1st LTE Site ID	1st Tower Azimuth	1st Tower LAT	1st Tower LONG
63722	*40*	*33.944283*	*-83.961201*
63722	*40*	*33.944283*	*-83.961201*
63722	*40*	*33.944283*	*-83.961201*

TOWERS

eNodeB_ID

Azimuth

eNodeB_ID	Sector_ID	Latitude	Longitude	Azimuth
63722	L9AT4016E11	33.944283	-83.961201	40

You Must use a tower list from the time the crime occurred

T-Mobile
Tower List Sector Orientation

TOWERS

CID: 28506
No Sector Orientation

Sector	MI	LA	Cell_i	Orientatic	horiz_bw	Lat_decim	Lon_decima	Cell_Name	IAP_System
12UAA	260	33699	28506			28.4010855	-81.4029952	UA2E0432A12	4044558047

Sector Column

CID: 28501 or 11UAA: Sector 1, Carrier 1, UMTS, AWS, Macro
- Orientation shows "0" Degrees or North

CID: 28506 or 12UAA: Sector 1, Carrier 2, UMTS, AWS, Macro
- Orientation is blank, however it shares the same orientation as 11UAA. (0 Degrees or North

Sector	MI	LA	Cell_i	Orientatic	horiz_bw	Lat_decim	Lon_decima	Cell_Name	IAP_System
11UAA	260	33699	28501	0	65	28.4010855	-81.4029952	UA2E0432A11	4044558047
11UPA	260	33699	61041			28.4010855	-81.4029952	UA2E0432A11UPA	4044558047
12UAA	260	33699	28506			28.4010855	-81.4029952	UA2E0432A12	4044558047
31UAA	260	33699	28523	240	65	28.4010855	-81.4029952	UA2E0432A31	4044558047
A0GPA	260	28971	28501	0	65	28.4010855	-81.4029952		4044558047
21UPA	260	33699	61042			28.4010855	-81.4029952	UA2E0432A21UPA	4044558047
22UAA	260	33699	28517			28.4010855	-81.4029952	UA2E0432A22	4044558047
32UAA	260	33699	28528			28.4010855	-81.4029952	UA2E0432A32	4044558047
B0GPA	260	28971	28512	120	65	28.4010855	-81.4029952		4044558047
C0GPA	260	28971	28523	240	65	28.4010855	-81.4029952		4044558047

T-Mobile Switch Pooling

Not in New Mediation Reports- only in older records

- Switch pooling is a load sharing/load balancing system for T-Mobile
- It causes Voice calls and SMS to be listed in time zones other than where the phone was located
- Confirm switch times are correct before analyzing data

Switch list

Switch ID	MSC/IAP	MSC Locati
NVMSS969	1404455	Nashville
NVMSS319	1404455	Nashville
NVMSS930	1404455	Nashville
NVMSS970	1404455	Nashville
NVMSS319	1404455	Nashville

MSISDN	Start Time	Direction	Connected To	First Tower LAC / ENodeB_ID	First Tower Cell ID / ECGI_Cell	First Tower Latitude	First Tower Longitude	Last Tower LAC / ENodeB_ID	Last Tower Cell ID / ECGI_Cell	MSC Name
1401497	10/20/2014 08:41:24 AM	Outgoing	1401332	36488	30986	41.84435	-71.43616	36488	30986	NVMSS319
1401497	10/20/2014 08:55:26 AM	Outgoing	25516	36488	30986	41.84435	-71.43616	36488	30986	NVMSS319
1401497	10/20/2014 09:16:22 AM	Outgoing	1401323	36488	30986	41.84435	-71.43616	36488	30986	NVMSS319
1401497	10/20/2014 09:17:02 AM	Outgoing	1401497	36488	30986	41.84435	-71.43616	36488	30986	NVMSS319
1401497	10/20/2014 09:32:21 AM	Outgoing	1401497	36488	32484	41.82957	-71.4436	36488	32484	NVMSS319
1401497	10/20/2014 09:44:35 AM	Incoming	1401345	36488	32116	41.82428	-71.46816	36488	32115	NVMSS319
1401497	10/20/2014 09:46:22 AM	Outgoing	1401441	36488	31584	41.80799082	-71.4535027	36480	31581	NVMSS319
1401497	10/20/2014 09:47:48 AM	Incoming	1401441	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 09:50:25 AM	Incoming	1401398	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 09:55:09 AM	Incoming	1401345	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 09:55:39 AM	Incoming	1401556	NA	NA	NA	NA	NA	NA	
1401497	10/20/2014 09:56:01 AM	Outgoing	1401441	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:11:12 AM	Outgoing	1401497	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:12:35 AM	Outgoing	1401441	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:13:59 AM	Outgoing	1401952	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:14:46 AM	Outgoing	1401954	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:22:37 AM	Incoming	1401497	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319
1401497	10/20/2014 10:28:56 AM	Outgoing	1401632	36488	31586	41.80799082	-71.4535027	36488	31586	NVMSS319

Switch Pooling Switch List

MSC starts with	MSC Location (NOT TO BE INTERPRETED AS THE LOCATION OF THE DEVICE)
AT	Atlanta
CH	Chicago
CL	Cleveland
CR	Carolina
DA	Dallas
DC	Washington DC
DE	Detroit
DN	Denver
FL	Miami
HI	Honolulu
HN	Houston
IE	Inland Empire CA
IN	Indianapolis
JK	Jacksonville FL
KC	Kansas City
LA	Los Angeles
MN	Minneapolis
NE	New England
NO	New Orleans
NV	Nashville
NY	New York
OR	Orlando
PH	Philadelphia
PR	Puerto Rico
SC	Sacramento
SE	Seattle
SF	San Francisco
SP	Spokane WA
VG	Las Vegas

Engineering Data: True Call (Per Call Measurement Data)

This is a new report type for T-Mobile. It is not yet available in all markets.

Time **Location** **Distance**

Start Time	Duratio	End Time	Start Type	End Type	Final Dispositio	Start Cell	Start eNB	End Cell	End eN	S1	Release Cause	RSRP	RSRQ	End Timing Advance [Miles]	I
4/6/2018 2:50	10.525	4/6/2018 2:50	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-113	-11	5 0.15	N
4/6/2018 2:56	22.8	4/6/2018 2:56	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-121	-9	5 0.15	N
4/6/2018 2:56	41.414	4/6/2018 2:57	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-121		9 0.15	N
4/6/2018 2:57	10.283	4/6/2018 2:57	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-121	-9	5 0.15	N
4/6/2018 3:00	10.761	4/6/2018 3:00	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-119	-8	5 0.15	N
4/6/2018 3:11	10.586	4/6/2018 3:11	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-119	-8	5 0.15	N
4/6/2018 3:20	26.85	4/6/2018 3:20	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-97	-6	5 0.15	N
4/6/2018 3:22	36.863	4/6/2018 3:22	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-103	-6	5 0.15	N
4/6/2018 3:23	19.85	4/6/2018 3:23	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-99	-6	5 0.15	N
4/6/2018 3:25	10.588	4/6/2018 3:25	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-110		7 0.15	N
4/6/2018 3:25	15.967	4/6/2018 3:26	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-111		7 0.15	N
4/6/2018 3:27	10.562	4/6/2018 3:27	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-110		7 0.19	N
4/6/2018 3:31	10.472	4/6/2018 3:32	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-111		7 0.19	N
4/6/2018 3:34	11.283	4/6/2018 3:34	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-110		8 0.19	N
4/6/2018 3:49	10.627	4/6/2018 3:49	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-107	-6	5 0.19	N
4/6/2018 3:55	34.451	4/6/2018 3:55	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-110		7 0.15	N
4/6/2018 3:55	16.092	4/6/2018 3:55	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-111		7 0.19	N
4/6/2018 3:55	16.767	4/6/2018 3:56	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-110		7 0.19	N
4/6/2018 3:56	19.472	4/6/2018 3:56	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-111		8 0.15	N
4/6/2018 4:05	11.31	4/6/2018 4:05	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-112	-7	5 0.19	N
4/6/2018 4:11	33.732	4/6/2018 4:11	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-105	-6	5 0.24	N
4/6/2018 4:16	10.556	4/6/2018 4:17	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-113		7 0.15	N
4/6/2018 4:18	18.142	4/6/2018 4:19	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-116		8 0.15	N
4/6/2018 4:20	13.353	4/6/2018 4:20	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-115	-7	5 0.15	N
4/6/2018 4:22	29.016	4/6/2018 4:23	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-114		7 0.15	N
4/6/2018 4:23	17.231	4/6/2018 4:24	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-117	-7	5 0.15	N
4/6/2018 4:25	10.636	4/6/2018 4:25	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-114		7 0.15	N
4/6/2018 4:27	15.684	4/6/2018 4:27	New Connection	Connection Release	NORMAL RELEASE	310260012374529	48338.1	310260012374529	48338.1	Ra	io Network User Inactivity	-113		7 0.19	N


verizon

Verizon

Verizon Wireless
180 Washington Valley Road
Bedminster, NJ 07921

Contact Information:	
Verizon Security Assistance Team (VSAT): Subpoenas, Surveillance, Court Orders, Exigent Situations	(800) 451-5242
FAX (Subpoenas)	(888) 667-0028
FAX (Court Order/Search Warrant)	(888) 667-0026
FAX (Surveillance)	(800) 267-9129
FAX (Exigent)	(800) 345-6720

Verizon Landline:	
Security Control: Surveillance, Court Orders, Exigent	(800) 483-0722 Fax (800) 997-9981

Technology: CDMA & LTE

Verizon

How They Will Send Records	• Will provide a .csv file that can be imported into a Microsoft Excel file and email them to a secure law enforcement account, if requested • Request a raw Real Time Tool (RTT) report for calls and data separately
Length of Time CDRs are Maintained	• Call detail record with cell site information available for a rolling calendar year (1 year from the present date) • After this, records are expunged from the system
Location Based Services	• No current location based services besides cell site location, sector information, and timing advance, but they are working on creating a tool
Engineering Data Sets	• The tower/sector/distance report is called a RTT report and is usually available for approximately 8 days historical on a phone.
Length of Time Text Messages are Maintained	• Text messages are kept for approximately 7 days • Cost for text message content (real time) – $50 every five days per target number • Legal threshold – Search Warrant

Verizon

Cost Per Pen Register	• $50 administrative fee • $20 setup fee per switch (max $60) • $400 monthly maintenance per target per switch • $1,000 per target for 3 or more switches
Phrase to use in historical records orders/warrants	• "All available call detail records (CDR) to include SMS detail, data sessions, PCMD / RTT data, cell site and cell site sector information from (date) to present"
Calls to Destinations Search	• Available • There is no current cost for Calls to Destinations Search • Legal threshold- Subpoena • Court Order or Search Warrant is required for Cell Sites

Verizon
Lucent vs Nortel

Lucent

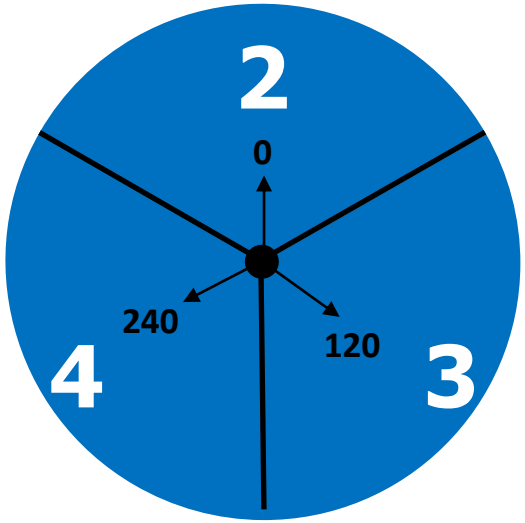
"Lose the 1"

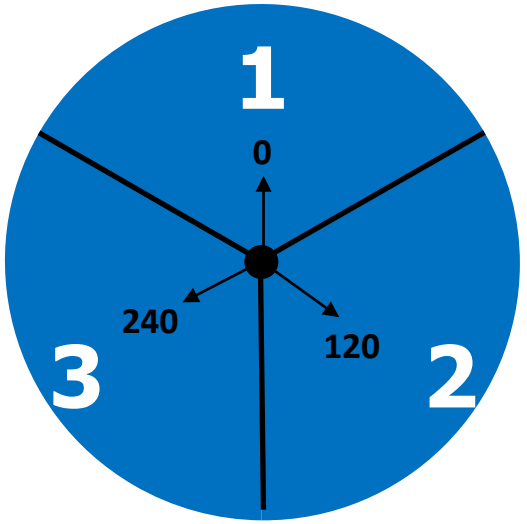
2 Alpha
3 Beta
4 Gamma

* Remember that cell sector orientations may vary tremendously depending upon your location. For that reason, you must check your tower list to determine the actual sector orientations for a tower.

Nortel

1 Alpha
2 Beta
3 Gamma





The Lucent rule applies to CDRs, not tower lists

Data Retention Periods

Record	Timeframe Available	Cost
Subscriber- post paid	3-5 Years **(may vary by legacy company)**	N/A
Call Details **(with or without cell sites)**	365 Rolling Calendar Days	N/A
Text Message Details	365 Rolling Calendar Days	N/A
Text Message Content	3-5 Days (never more than 10 days)	$50 per 5 day increment
IP Session Information	365 Rolling Calendar Days	N/A
IP Destination Information	60 Days	N/A
Picture Message Details	365 Rolling Calendar Days	N/A
Mobile IM Session Information	365 Rolling Calendar Days	N/A
Media Content	PixPlace only **(at point in time)**	N/A
Bill Copies- post paid	Last 12 Months	N/A
Payment History- Post Paid	3-5 Years **(may vary by legacy company)**	N/A
Bill Copies (over 12 months old)	3-5 Years **(may vary by legacy company)**	N/A
Check Copies	Approximately 6 Months	N/A
Credit Card Numbers	Approximately 6 Months	N/A
Store Surveillance Videos	Typically 30 Days	N/A
Service Applications	3-5 Years **(may vary by legacy company)**	N/A

Verizon CDR

Network Element Name	Mobile Directory Number	Dialed Digit Number	Call Direction	Seizure Dt Tm	Seizure Duration	First Serving Cell Site	First Serving Cell Face	Last Serving Cell Site	Last Serving Cell Face	Calling Party Number
Raleigh	919452	919797	1	1/1/2015 0:00	44	485	3 = Gamma	485	3 = Gamma	919452
Raleigh	919452	404955	1	1/1/2015 0:00	6	485	3 = Gamma	0	0	919452
Raleigh	919452	919797	1	1/1/2015 0:01	42	485	3 = Gamma	658	1 = Alpha	919452
Raleigh	919452	404585	1	1/1/2015 0:01	7	485	3 = Gamma	0	0	919452
Raleigh	919452	919452	F	1/1/2015 0:04	39	0	0	0	0	919599
Raleigh	919452	919452	F	1/1/2015 0:04	6	0	0	0	0	202760
Greensboro_MTX	919452	919797	5	1/1/2015 0:04	4	0	0	0	0	202760
Raleigh_MTX08	919452	404585	5	1/1/2015 0:04	14	0	0	0	0	919599
Raleigh	919452	919599	1	1/1/2015 0:05	108	475	1 = Alpha	464	3 = Gamma	919452
Raleigh	919452	919452	0	1/1/2015 0:11	33	464	3 = Gamma	616	1 = Alpha	919358
Raleigh	919452	919452	0	1/1/2015 0:29	97	464	3 = Gamma	464	3 = Gamma	919358
Raleigh	919452	919452	0	1/1/2015 0:39	45	464	3 = Gamma	464	3 = Gamma	919797
Raleigh	919452	919519	1	1/1/2015 1:06	266	464	3 = Gamma	616	1 = Alpha	919452
Raleigh	919452	404955	1	1/1/2015 1:06	7	464	3 = Gamma	0	0	919452
Raleigh	919452	919358	1	1/1/2015 1:11	43	464	3 = Gamma	464	3 = Gamma	919452
Raleigh	919452	404955	1	1/1/2015 1:11	7	464	3 = Gamma	0	0	919452

The target #

dialed to initiate the call. Inbound calls: this # will be the same as the Mobile Directory Number column. Outbound calls: this is the # your target dialed.

Exact date and time of the start of each call

Duration of the call in seconds

Site the target phone was hitting off of when the call initiated

Cell site sector of the terminating call

Cell site that the target phone was hitting off of when the call terminated

This is the switching equipment that transacted the call. A switch is named by the basic geographic area it covers. Switches route calls for hundreds of cell sites.

Type of call
0 & 6: Inbound calls
F: Voicemail or forwarded calls
1 & 3: Outbound calls
2: mobile to mobile
Other #s: unknown call type

Cell site sector of the initiated call. Direction the target was facing the tower at the time of this call. Each cell face is approx. 120 degrees.

Calling party that initiated the call. Outbound calls: this # will be the same as the Mobile Directory # column, and will be the # that dialed the target.

Verizon CDR & Tower List

CDR

Network Element Name

First Serving Cell Site

First Serving Cell Face

Network Element Name	Mobile Directory Number	Dialed Digit Number	Call Direction	Seizure Dt Tm	Seizure Duration	First Serving Cell Site	First Serving Cell Face	Last Serving Cell Site	Last Serving Cell Face	Calling Party Number
Azusa53	626261	818854	0	12/25/2012 11:05	28	374	3	374	3	626529
Azusa53	626261	818854	0	12/25/2012 11:06	26	374	3	374	3	626529
Azusa53	626261	818854	0	12/25/2012 11:06	26	374	3	374	3	626529
Azusa53	626261	818854	0	12/25/2012 11:07	42	72	3	72	3	626529
Azusa53	626261	818854	0	12/25/2012 11:08	26	72	3	72	3	626529
Azusa53	626261	818854	0	12/25/2012 11:08	27	72	3	72	3	626529

TOWERS

Switch Number

Cell Number

Sector

Market SID	Switch Number	Switch Name	Cell Number	E-911 Latitude Degrees (NAD83)	E-911 Longitude Degrees (NAD83)	Sector	Technology	Azimuth (deg)
2	53	NT53	72	34.182222	-118.166444	3	Digital	100
2	53	NT53	374	34.1657	-118.1501	3	Digital	350

RTT (Real Time Tool) CDRs

CDR

Network Element Name | **First Serving Cell Site** | **First Serving Cell Face**

Network Element Name	Mobile Directory Number	Dialed Digit Number	Call Direction	Seizure Dt Tm	Seizure Duration	First Serving Cell Site	First Serving Cell Face	Last Serving Cell Site	Last Serving Cell Face	Calling Party Number
Newport_News2	334750	334750	6	6/6/2014 11:35	24	127	2 = Alpha	127	2 = Alpha	347957
Newport_News2	334750	334750	6	6/6/2014 11:37	3	127	2 = Alpha	127	2 = Alpha	757217

RTT

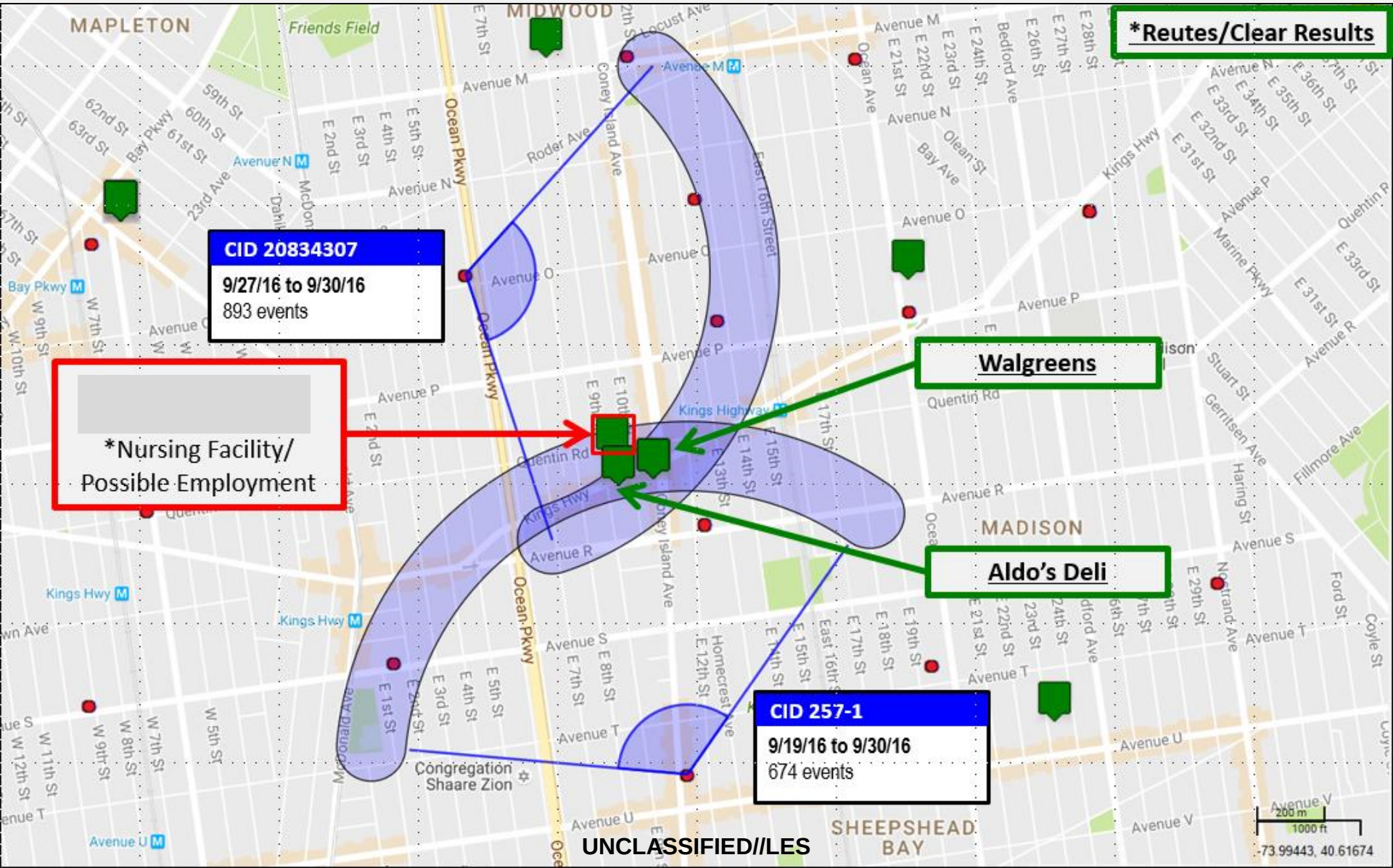
No Switch Name | **Int Cell** | **Sector** | **Access Distance (miles)**

Date *	Access Time	Call End Time *	Call Length (sec)	Originated Digits	Subscriber #	Entry Type *	Tech Type *	nit Cell	nit Sector	ccess Dist (mi	Last Cell	Last Sector	Calling Party #	Call Latitude	Call Longitude	Call Location
6-Jun	11:37:34	11:37:39	5	0	33475	Term	3GV	127	1	0.56	127	1	757217	36.85462	-75.98003	L
6-Jun	11:36:23	11:36:23	0	0	33475	Term	SMS	127	1	0.56	127	1	0	36.85521	-75.98142	L

*** A Verizon CDR may represent LUCENT Sectors (2, 3, 4), but Verizon RTT will always represent Sectors (1,2,3) whether LUCENT or NORTEL**

- Verizon Wireless offers a service known as the Real Time Tool.
- This info is provided to law enforcement during exigent circumstances or if requested in a legal document.
- Data exists for approximately 3-7 days
- Includes approximate distance from the tower

RTT
Sample Mapping



UNCLASSIFIED//LES

verizon wireless

LAW ENFORCEMENT RESOURCE TEAM
180 Washington Valley Rd. | Bedminster, NJ 07921
Phone: 800-451-5242 | Fax: 888-667-0026, 888-667-0028

Historical SMS (Text Message) Detail Report Explanation Form

NET_ELEM_NM	SWITCH_TYPE_IND	MDN	MSG_SND_DT_TM	MSG_DLVR_DT_TM	MSG_CMPLN_STAT	ORIG_ADDR	DEST_ADDR	MSG_DIRN_IND	MIN
This is the text message platform that processed the text message.	Indicates one of two switch types - M or L. This is used to determine the MSG_CMPLN_STAT codes.	This is your Target #.	This is the Date & Time that the text message was sent.	This is the Date & Time when the text message was delivered.	Message completion status indicator. 01=delivered *additional codes below	This is the message sender.	This is the recipient of the message.	This is the direction of the text message. 1=Incoming, 2=Outgoing 3=Incoming, 4=Outgoing	The MIN is the unique identifier the network(s) uses to route traffic for a device/MDN. It is not always the same as the MDN.

*Additional MSG_CMPLN_STAT codes

Switch type "M"	Switch type "L"
01 = delivered	01 = delivered
02 = expired	05 = deleted/manually deleted
03 = network service denied	07 = undeliverable
04 = invalid subscriber on switch	08 = expired
05 = denied subscriber on switch	09 = unknown (pending, status, other)
06 = invalid subscriber on MR	
07 = subscriber short message buffer full	
08 = message cancelled	
09 = message replaced	
0A = outside cdma coverage	
0B = subscriber deactivated	
0C = alternate page delivery attempted	
0D = alternate page delivery failed	

verizon

VERIZON SECURITY ASSISTANCE TEAM
180 Washington Valley Rd | Bedminster, NJ 07921
Phone: 800-451-5242 | 888-667-0026, 888-667-0028

VOLTE Call Detail w/ Cell Sites Explanation Form

Record Open Date/Time	Record Open Dt/Tm(GMT)	SID	NID	Cell ID	Cell Face	Market ID	ENB #	DIR	MSISDN	Called #	CPN	SOU	RAT	VICE / Endpoints	VZWNE (Network Extender) / V4B
Start Time of the call (local time). Note that calls involving forwarding or voicemail will reflect in GMT.	Start Time of the call (GMT)	Serving System ID	Switch Number (MSCID)	This is the cell site that the target phone was hitting off of when the	This is the cell site sector of the initiated call. This information denotes the direction the	3 Digit Switch Number	6 Digit Cell Site Number (First 3 Digits = Market ID	MO = Outbound Call MT = Incoming Call	This is your target #	This is the number dialed to initiate the call. For inbound calls this number will be the same as the Mobile Directory Number (MSISDN) column and for	This is the calling party that initiated the call. If the call is outbound this column will be the same as the Mobile Directory Number (MSISDN). If the	Call Duration in Seconds (Seconds of Use)	Radio Access Terminal (1x = 3g Voice, LTE = 4g	VoLTE Internet Connected Endpoints Indicator.	Indicates if the call processed through a network extender

Cell Face (Sector) Breakdown
1 = Sector "D1" (Alpha)
12 = Sector "D1" (Alpha)
2 = Sector "D2" (Beta)
22 = Sector "D2" (Beta)
3 = Sector "D3" (Gamma)
32 = Sector "D3" (Gamma)

***86 is voicemail retrieval**
#225 is checking account balance
#646 is checking minutes
#777 is data/web services
#738 is prepaid voicemail retrieval
#729 is adding minutes for prepaid
***67 Activates Selective Caller ID Block**
***82 Deactivates Selective Caller ID Blocking**


U.S. Cellular

US Cellular

Legal Compliance Department
8410 Bryn Mawr Ave., suite 800, Chicago, IL 60631
subpoenacompliance@uscellular.com

Contact Information:	
Subpoena/Order/Warrant Group Phone	Phone (800) 333-4847 Fax (866) 669-0894
After Hours Contact Info	Phone (630) 875-8270 Fax (865) 777-8333

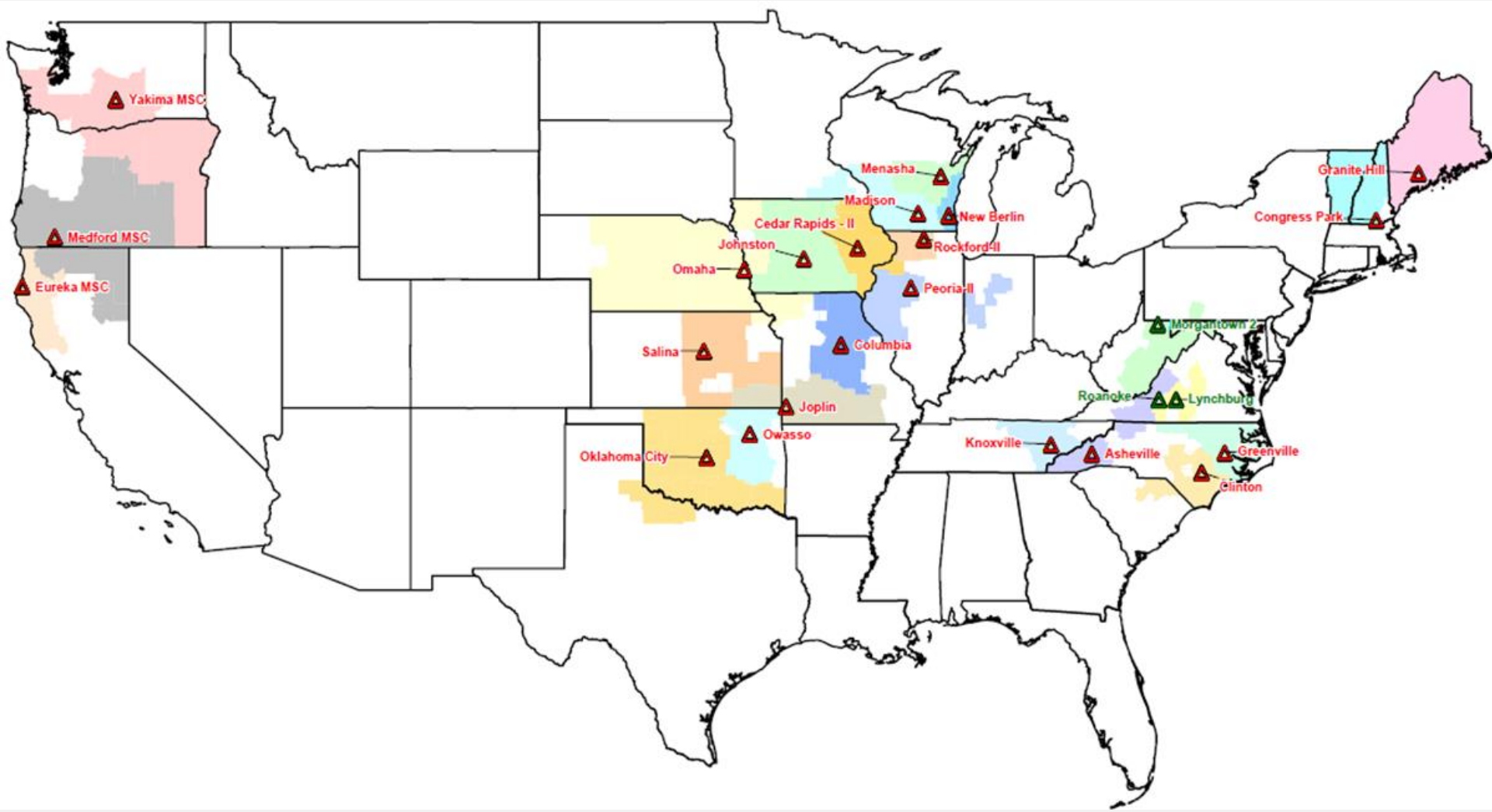
- GSM Tower located in Northern Maine
- No LTE records are being provided currently
- Roaming Issues
- Only 2 compliance personnel

- Hex vs. Decimal
- PCMD in certain markets
- **Cannot use CASTViz**

Technology: CDMA, LTE, GSM (1 tower)

U.S. Cellular

Where are they???



Type of Records Provided & Retention time

Type of Information	Description	Retention Period
Call Detail Records	Details the outgoing and incoming phone numbers, captures date and time of calls.	1 rolling calendar year
Text Message Records	Details the outgoing and incoming phone numbers, captures date and time of text messages.	1 rolling calendar year
Content of Text Messages	Captures the content of information sent via text.	3-5 days
Bill Reprints	Reprint of customers billing statement.	estimated 7 years
Cell Tower Information	Tower information that call was processed through.	1 rolling calendar year
Subscriber Information	Name, address, social security number, equipment type, activation date and location of service activation.	Estimated 7 years, depending on conversion
Payment History	Payment amounts, date payment made and source type (i.e. credit card, check, IVR or cash).	1 rolling calendar year
Account Memos	Record of customer interaction with U.S. Cellular® front line associates.	From July 2013 to present

US Cellular

How They Will Send Records	• Will email Excel (.xls) files to secure law enforcement accounts. Voice and SMS are provided in separate files.
CDRs (Voice)	• Available for 1 rolling calendar year. • Includes incoming/outgoing completed and incomplete calls, calls routed to voicemail, and calls using multiple switches (Roaming calls must be requested from carrier handling the calls).
Location Based Services	• Does not have a real time locator tool service, but can ping phone in exigent circumstances per request. • PCMD available in Roanoke (VA), Lynchburg (VA) and Morgantown (WV) markets only. • Can provide Pen/TT records.
SMS Toll Records	• 1 rolling calendar year. Provided separately from voice CDRs. • Includes sending and receiving information (e.g.: when the text was sent & when it was received, originating & terminating numbers, etc.). • Cell sites not provided • SMS Content is available for 3-5 days

- Current Tower Lists contain both HEX and DEC CLLI (aka, Tower and Sector).

CDR

CID (Hex) & Sector **Switch**

Start Date	Connect Time	Orig Number	Dialed Digits	Called Number	Orig CLLI	Term CLLI	Switch
05/25/2016	14:13:12	207691	207790	207790	5C43	5AF3	GRAN
05/25/2016	14:13:27	207691	207790	207790	5C43	5AF3	GRAN

TOWERS

CID (Hex) & Sector **Switch**

CELL SITE NUMBER (DEC)	CELL SITE NUMBER (HEX)	SECTOR ID	SWITCH NAME	LATITUDE	LONGITUDE	SECTOR AZIMUTH
1476	5C4	1	Granite Hill	44.11294444	-69.11938889	0
1476	5C4	2	Granite Hill	44.11294444	-69.11938889	110
1476	5C4	3	Granite Hill	44.11294444	-69.11938889	230