IN THE SUPREME COURT OF IOWA

No. 19–0454

Submitted September 16, 2020—Filed December 11, 2020

STATE OF IOWA,

Appellee,

vs.

JACOB A. BOOTHBY,

Appellant.

On review from the Iowa Court of Appeals.

Appeal from the Iowa District Court for Clinton County, Phillip J. Tabor, District Associate Judge.

Defendant seeks further review of the court of appeals decision declining to address ineffective-assistance-of-counsel claims but preserving them for postconviction-relief proceedings. We conclude the ineffective-assistance claims fail. **DECISION OF COURT OF APPEALS VACATED; DISTRICT COURT CONVICTION AFFIRMED.**

Oxley, J., delivered the opinion of the court, in which all justices joined.

Martha J. Lucey, State Appellate Defender, and Ashley Stewart (argued), Assistant Appellate Defender, for appellant.

Thomas J. Miller, Attorney General, Martha E. Trout (argued), Assistant Attorney General, Mike Wolf, County Attorney, and James M. McHugh, Assistant County Attorney, for appellee.

OXLEY, Justice.

As society becomes more attached to cell phones, cell site technology seemingly makes tracking people look like following a breadcrumb trail while their phones ping off cell towers along their route. The technology is more complicated than that, and this case asks us to decide whether testifying about the records created from that technology requires an expert witness.

After a vehicle rammed the back of another car travelling down 190th Street just outside of Toronto, Iowa and a neighbor suggested Jacob Boothby may have mistaken the vehicle for his ex-girlfriend's, investigating officers used Boothby's cell phone records to place him in the general vicinity at the time of the incident. Following his convictions for assault with a dangerous weapon and third degree criminal mischief, Boothby claimed on direct appeal that his counsel was ineffective for not challenging the phone records as inadmissible hearsay and not challenging the officer's testimony as an unqualified expert. We transferred the appeal to the court of appeals, which concluded the record was insufficient to determine whether counsel had tactical reasons for not objecting and preserved the claims for postconviction-relief proceedings.

Boothby sought further review, which we granted to address as a matter of first impression whether Iowa Rules of Evidence 5.701 and 5.702 require testimony concerning historic cell site data to be presented by an expert. Having carefully reviewed the officer's testimony and surveyed other jurisdictions, we now hold that the specific testimony provided by Officer Schroeder was not based on specialized knowledge and therefore did not require an expert. As such, any challenge by his counsel would have been pointless, and Boothby's ineffective-assistance claims fail. We vacate the court of appeals decision preserving Boothby's claims for

postconviction-relief proceedings and affirm Boothby's district court convictions.

I. Factual Background and Proceedings.

In the early morning hours of November 14, 2017, Bernadette Chell was driving her boyfriend, Steven Duvall, to work. Duvall noticed a gray SUV traveling in the opposite direction on the two-lane road, identifying it as possibly a 1999 or 2000 "Blazer or Jimmy." The SUV turned around and began following them. Chell slowed to let it pass, but instead, the SUV "slammed" Chell's car. Chell and Duvall scrambled to call 911, and Chell sped up to try to get away. The SUV rammed their car a second time, and Chell and Duvall got through to the police. Following the second impact, the SUV "just turned off and disappeared," and Chell and Duvall stopped to wait for the police.

Neither Chell nor Duvall recognized the driver of the car or got a license plate number. After the police arrived to speak with the couple, Shawn Barten emerged from a nearby house. Barten was worried about Shalan Miller, a friend who had borrowed his car and should have returned by then. He told the officer that Miller's on-again, off-again-boyfriend, Jacob Boothby, had tried to call and text him and Miller throughout the previous night and into the early morning hours and that Boothby was mad at Barten for spending time with Miller.

Officer Jessup Schroeder took over the investigation a few days later and went to speak with Boothby. At Boothby's home, he observed a silver Chevrolet Trailblazer with a missing bumper. In a conversation recorded by a camera in Schroeder's patrol car and played at trial, Boothby admitted he contacted Barten and Miller many times the night before and early morning of November 14 but denied involvement in the hit-and-run

incident. He also showed Officer Schroeder the bumper from the Trailblazer.

Officer Schroeder took possession of the bumper to further investigate, but it had no evidence of paint transfer. Boothby later sent a text to Officer Schroeder, claiming "I think that [Barten is] a snitch . . . so i will give that lady the money but im not saying that i did it." Officer Schroeder also obtained a warrant for phone records from Boothby's cell phone company. Those records showed numerous calls and texts sent from Boothby's phone to both Barten's and Miller's cell phones throughout the time period leading up to the incident. The records also identified the specific cell tower with which Boothby's cell phone connected in making each of those calls and texts.

The State charged Boothby with assault with a dangerous weapon and third-degree criminal mischief, both aggravated misdemeanors. At trial, Officer Schroeder testified about the cell phone records he obtained, which were admitted as exhibits. He explained how he used the records to identify the cell towers Boothby's phone pinged when he made the numerous calls leading up to the time of the incident and then plotted the location of the cell towers on a map he created using Google Earth. He also plotted the address of the incident near Toronto and Boothby's home address near Spragueville on the map and identified each tower's "sectors" and coverage radius. The map was introduced as an exhibit at trial. Neither the State nor Boothby asked Officer Schroeder if he had any particular expertise in reading or interpreting cell phone records. Boothby did not object to the exhibits or Officer Schroeder's testimony.

The jury convicted Boothby of both charges. The district court sentenced Boothby to two years in prison for each charge, to be served

consecutive to another sentence Boothby was serving related to other charges involving Miller.

Boothby appealed, and we transferred the case to the court of appeals. Recognizing he did not object below, Boothby argued his counsel was ineffective for not challenging the cell tower records and related testimony. Particularly, he argued the evidence should have been presented by an expert and his cell phone records should have been excluded as impermissible hearsay. The court of appeals concluded the record was insufficient to address whether trial counsel had a tactical reason for not challenging the evidence and preserved Boothby's claims for postconviction-relief proceedings.

Our court has never addressed whether testimony about cell tower records and related locations requires an expert witness. In the cases that have reached our court of appeals, the officers were qualified as experts by their training, and the court did not address whether the testimony required an expert rather than a lay witness. We granted Boothby's application for further review to address this issue.

II. Standard of Review.

We review claims of ineffective assistance of counsel de novo. *State v. Thorndike*, 860 N.W.2d 316, 319 (Iowa 2015). "To succeed on a claim of ineffective assistance of counsel, a claimant must establish by a preponderance of the evidence: '(1) his trial counsel failed to perform an essential duty, and (2) this failure resulted in prejudice.' " *Id.* at 320 (quoting *State v. Adams*, 810 N.W.2d 365, 372 (Iowa 2012)). We deny an ineffective-assistance claim if the defendant fails to show either prong. *Id.*

"Under the first prong, 'we measure counsel's performance against the standard of a reasonably competent practitioner.' " *Id.* (quoting *State v. Clay*, 824 N.W.2d 488, 495 (Iowa 2012)). We presume counsel

performed competently, "and the claimant must successfully rebut this presumption by establishing by a preponderance of the evidence that counsel failed to perform an essential duty." *Id.* We consider the totality of the circumstances to determine whether counsel's performance was reasonable under prevailing professional norms. *Id.*

Under the prejudice prong, Boothby must show "there is a reasonable probability that, but for counsel's unprofessional errors, the result of the proceeding would have been different." *State v. Harrison*, 914 N.W.2d 178, 206 (Iowa 2018) (quoting *Ledezma v. State*, 626 N.W.2d 134, 143 (Iowa 2001) (en banc)). To meet this standard, Boothby "must show that, 'absent the errors, the fact finder would have had a reasonable doubt respecting guilt.' " *Id.* (quoting *Ledezma*, 626 N.W.2d at 143).

We are asked to decide whether Boothby's counsel was ineffective in two respects: (1) failing to object to U.S. Cellular phone records as inadmissible hearsay, and (2) failing to object to Officer Schroeder's testimony using the U.S. Cellular records to create a map because he was not qualified as an expert. If the evidence was properly admitted, counsel could not have been ineffective and his claim must fail. *See State v. Smith*, 573 N.W.2d 14, 21 (Iowa 1997) (affirming denial of ineffective-assistance claim where challenge to admission of evidence would have lacked merit).

III. Whether the U.S. Cellular Records are Inadmissible Hearsay.

Boothby argues the U.S. Cellular records in State's exhibits 10 and 11 are inadmissible hearsay and his counsel was ineffective for failing to object to their admission. The State argues the records are not hearsay

because there was no human "declarant"[1] but even if they are hearsay, they fall within the business records exception.

Hearsay is a (1) statement made by a (2) declarant (3) not made while testifying at the current trial or hearing, which (4) the "party offers into evidence to prove the truth of the matter asserted in the statement." Iowa R. Evid. 5.801(*c*)(2). We have previously recognized that phone records fit the definition of hearsay. *See State v. Lain*, 246 N.W.2d 238, 242 (Iowa 1976) ("The telephone bill was a written hearsay statement, as the State offered it to prove the telephone calls were in fact made as the bill purported to show."). The U.S. Cellular records were introduced to show that Boothby's phone communicated with the cell towers identified in the records at specific times around the time of the incident, satisfying the requirement that the evidence be an out-of-court statement offered to prove the matter asserted.

Under the business records exception to the hearsay rule, a party may introduce records of regularly conducted activity if specific requirements are met. Iowa R. Evid. 5.803(6). Those requirements include:

> (A) The record was made at or near the time by—or from information transmitted by—someone with knowledge;
>
> (B) The record was kept in the course of a regularly conducted activity of a business, organization, occupation, or calling, whether or not for profit;
>
> (C) Making the record was a regular practice of that activity[.]

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[1]Because the Certificate of Authenticity attached to the records indicates they were generated "by (or from information transmitted by) *a person* with knowledge of those matters" and the State offered no contrary evidence, we need not address the State's alternative argument about the lack of a human declarant. (Emphasis added.)

Id. r. 5.803(6)(A)–(C). A certification meeting the self-authentication conditions of rule 5.902(11) can prove these requirements without the need for a witness testifying at trial. *Id.* r. 5.803(6)(D).

The State introduced exhibit 10, which included a Certificate of Authenticity signed by U.S. Cellular subpoena specialist Solangia Haddock to provide the foundation for admitting the phone records. In the certificate, Ms. Haddock certified that:

> such records were made, at or near the time of the occurrence of the matters set forth, by (or from information transmitted by) a person with knowledge of those matters;
>
> such records were kept in the course of a regularly conducted business activity;
>
> the business activity made such records as a regular practice;
>
> if such record is not the original, such record is a duplicate of the original.

Ms. Haddock signed the Certificate of Authenticity under penalty of perjury. This certificate meets the self-authentication requirements of rule 5.902(11), at least for most of the cell site records. *See United States v. Yeley-Davis*, 632 F.3d 673, 678 (10th Cir. 2011) ("The certification and affidavit signed by the Verizon records custodian establish that the phone records are business records."); *Fry v. State*, 885 N.E.2d 742, 748 (Ind. Ct. App. 2008) ("The certifications provided by the State were evidence that the cell phone records were records of regularly conducted business, and therefore admissible hearsay.").

We say "most" because not all pages of exhibit 10 fall within the documents identified in the Certificate of Authenticity. Ms. Haddock identified the certified records as "Subscriber Information, call records, tower information, and text messages for [Boothby's phone number] time period 11/13/2017 to 11/14/2017." However, exhibit 10 appears to

include more than those identified documents. The exhibit consists of "19 of 19" pages of call records for the identified cell number including line item details for calls made or received on November 13 and November 14, 2017. Those records are followed by a page containing a narrative, purporting to explain how "[t]o convert Orig CLLI or Term CLLI to find the cell tower location" and how "[t]o determine cell tower location." The narrative is in a different font than the nineteen-page report of calls, and it is followed by a signature block for Camesha Daniel, a U.S. Cellular Subpoena Compliance Specialist. The Certificate of Authenticity does not identify this narrative document as part of the documents to which the certificate applies. The State failed to lay a sufficient foundation to establish that this narrative page of exhibit 10 falls within the business records exception to the hearsay rule.

Nonetheless, to the extent that page may have been introduced to prove the truth of the matter asserted, i.e., how to convert the CLLI records to find the cell tower locations or how to determine the cell tower locations, its introduction did not prejudice Boothby and therefore cannot support an ineffective-assistance claim. To meet the prejudice prong of his ineffective-assistance claim, Boothby would have to show that without this page of the exhibit, the jury would have had reasonable doubt about his guilt. *Harrison*, 914 N.W.2d at 206. But no witness referenced that page of the exhibit during the trial. Our review of Officer Schroeder's testimony detailing how he used specific lines of the call records to identify each cell tower and its location makes clear he did not rely on the narrative to determine the location of the towers. To the extent any juror even saw the narrative as part of the exhibit, it would not have changed the outcome of Boothby's trial.

While we conclude the narrative constituted inadmissible hearsay not excepted by the business records exception, Boothby cannot satisfy the prejudice prong of his ineffective assistance claim. *See Thorndike*, 860 N.W.2d at 319. Boothby's ineffective assistance claim based on failure to object to the admission of hearsay documents fails.

IV. Whether an Expert Witness is Required to Present Historical Cell Site Data.

Boothby argues only an expert can explain use of historical cell site records to create the map introduced at trial and opine about locations based on those records. He also argues Officer Schroeder was not qualified as an expert, so the testimony should not have been admitted.

Until 2017, the only requirements for use of lay opinion testimony under our rules of evidence were that the opinion be "[r]ationally based on the witness's perception" and "[h]elpful to clearly understanding the witness's testimony or to determining a fact in issue." Iowa R. Evid. 5.701(*a*)–(*b*). In 2017, we added subsection (*c*), which limits "testimony in the form of an opinion" offered by a lay witness to "one that is: . . . *c.* Not based on scientific, technical, or other specialized knowledge within the scope of rule 5.702." *Id.* r. 5.701(*c*); 7 Laurie Kratky Doré, *Iowa Practice Series: Evidence* § 5.701:1, at 755 (2019–2020 ed. 1999) [hereinafter Doré, *Iowa Practice Series*]. Such testimony is "routed instead to the rules governing the admission of expert testimony." Doré, *Iowa Practice Series* § 5.701:1, at 764–65; *see also* Iowa R. Evid. 5.702 (allowing "[a] witness who is qualified as an expert by knowledge, skill, experience, training, or education [to] testify in the form of an opinion").

Subsection (*c*) is patterned after the federal rules, which added the same limitation to Federal Rule of Evidence 701 in 2000. Fed. R. Evid.

701 advisory committee's note to 2000 amendment; Doré, *Iowa Practice Series* § 5.701:1, at 755. According to the committee notes,

> the distinction between lay and expert witness testimony is that lay testimony "results from a process of reasoning familiar in everyday life," while expert testimony "results from a process of reasoning which can be mastered only by specialists in the field."

Fed. R. Evid. 701 advisory committee's note to 2000 amendment (quoting *State v. Brown*, 836 S.W.2d 530, 549 (Tenn. 1992)). Many courts have applied a " 'process of reasoning' approach for distinguishing lay from expert testimony." *King v. United States*, 74 A.3d 678, 682–83 (D.C. 2013) (adopting the Second Circuit's process of reasoning approach and concluding officers could offer lay testimony where "the reasoning process the officers employed to interpret the street language was the everyday process of language acquisition"); *see also United States v. Garcia*, 413 F.3d 201, 215 (2d Cir. 2005) ("[I]n considering the third prerequisite for lay opinion testimony, a court must focus on 'the reasoning process' by which a witness reached his proffered opinion." (quoting 4 Jack B. Weinstein & Margaret A. Berger, *Weinstein's Federal Evidence* § 701.03[1], at 701–14 (Joseph M. McLauglin ed., 2d ed. 2004) [hereinafter Weinstein]). "If the opinion rests 'in any way' upon scientific, technical, or other specialized knowledge, its admissibility must be determined by reference to Rule 702, not Rule 701." *Garcia*, 413 F.3d at 215 (quoting Weinstein § 701.03[1], at 701–14)).

This is our first opportunity to address whether testimony is lay or expert under the revised rules of evidence, i.e., whether the evidence is "based on scientific, technical, or other specialized knowledge." Iowa R. Evid. 5.702. Determining whether opinion testimony is lay or expert "requires a case-by-case analysis of both the witness and the witness[]'s

opinion." *United States v. Smith*, 591 F.3d 974, 983 (8th Cir. 2010). Before we look at the specific testimony provided by Officer Schroeder, it is helpful to first understand what evidence is available from cell site data and how it is used in police investigations to assist in our determination of whether Officer Schroeder improperly gave opinion testimony based on scientific, technical, or specialized knowledge.

A. Historical Cell Site Data. "Cell phones are like two-way radios. They require a transceiver to transmit the phone calls, and those transceivers are called cell sites or cell towers." Alexandra Wells, *Ping! The Admissibility of Cellular Records to Track Criminal Defendants*, 33 St. Louis U. Pub. L. Rev. 487, 491 (2014) [hereinafter Wells] (footnote omitted). Cell towers are generally arranged in a honeycomb-shaped grid to avoid coverage gaps, with a cell site or cell tower located at the intersection of three different hexagonal areas. *Id.* "This shape is better than other potential configurations, such as a circle, as it allows the towers to leave no area without service." *Id.*

A number of factors determine a particular cell tower's coverage area, including "[t]he number of antennas operating on the cell site, the height of the antennas, topography of the surrounding land, and obstructions (both natural and man-made)." Aaron Blank, *The Limitations and Admissibility of Using Historical Cellular Site Data to Track the Location of A Cellular Phone*, 18 Rich. J.L. & Tech. 3, 5 (2011) [hereinafter Blank]. The cell tower's range is essentially a mathematical calculation of the area of the circle around the cell tower, with the furthest distance of cell service serving as the radius. *Id.* at 5 n.12. A cell tower's range may vary from up to thirty miles from the cell site to around one mile from the cell site. *Id.* at 5. Urban areas often have overlapping cell sites located every one-

half to one mile, whereas rural areas often have cell sites every three to five miles. *Id.*

"When a user places a call, the cell phone connects to the cell site with the strongest signal." *Id.* at 6. Although the cell phone must be within the coverage area of the tower it connects to, "the tower with the strongest signal . . . is not always the cell tower geographically closest to the cell phone." Wells at 493. Rather, a number of factors affect which tower a cell phone connects to, including technical characteristics of the cell sites, characteristics of the phone making the connection, and environmental and geographic factors. *Id.*

Cell phones can be tracked by two main methods: "(1) Global Positioning Systems [GPS] and (2) cell site data—which include both real-time and historical data." *Id.* at 489. GPS tracking involves satellite-based navigation systems that receive signals from cell phones and convert the delivery speed of the signal into distance to provide an accurate reading of the phone's location. *Id.* at 489–90. Real-time and historical cell site data both use cellular technology to locate a cell phone and differ only in the timing of when the signal is observed. *Id.*

> Real-time cell site data is obtained through viewing the cell phone's activity and signals in real time, meaning at that instant. Thus, this largely happens when police officers survey a particular cell phone's activity. On the other hand, historical cell site data . . . is information obtained after the cell phone's activity is recorded using the cell companies' records of that activity.

Id. at 490 (footnotes omitted).

This case involves use of historical cell site data. "Often historical cell site records only indicate the date, time, and duration of calls, whether calls are inbound or outbound, and show the originating and terminating cell sites for calls received or placed on the phone." Blank at 13. Cell

phone companies collect this data to bill customers and track call volume. Wells at 499. Thus, historical cell site data includes information about which towers a cell phone pinged at particular times and, although the data shows a cell phone was within the broad range of a cell site, it cannot provide a precise location at any given moment. *Id.*

With this background, we turn to the specific testimony provided by Officer Schroeder and challenged by Boothby.

B. Officer Schroeder's Testimony. When asked to explain the cell phone records he had subpoenaed, Officer Schroeder testified,

> So [exhibit 11] is a spreadsheet that U.S. Cellular provides that has a location of their cellphone towers and the corresponding codes that we use from the cellphone records [in exhibit 10] so that we can determine which cellphone towers and which sectors of each tower the cellphone used.

The State then asked Officer Schroeder to describe what he did with the records. Specific to the cell tower issue, Officer Schroeder explained, "[t]here's also a column labeled original CLLI that has a code that consists of numbers of letters and this column is a way how we determine what cellphone tower was utilized by the phone number." After that explanation, the State and Officer Schroeder had the following exchange:

> Q. And so then that tells you which tower was used? A. That's correct. Based on the information in the original CLLI column, we can determine the physical location of the tower, the physical address where it's located, and then also by that fourth character, the number, it tells us which sector of the tower is being utilized by the phone. Typically cellphone towers are separated into three sectors. If you would think of a cellphone tower at the center and then a circle around it, they are typically separated into three sectors from the tower.
>
> Q. And so the sector with the information provides what details to you as an investigator? A. The sector information tells us which sector or direction from the tower that the cellphone is, what direction from the tower, roughly.
>
> Q. And so how do you go from the—at one column the originating CII column to knowing the physic[al] location of

the tower? A. The exhibit that you gave me, No. 11, the spreadsheet with all the locations, it has the original CLLI number and then by looking at that, you can look over and get the actual physical address of the tower where it's located, where the tower actually sits, and then also it provides information for each tower as to where each sector starts. It goes by degrees in the 360-degree circle, so you can roughly show where the sectors start and end for the three sectors for each tower.

Q. And so using this information, you looked at the cellphone records. What did you observe? A. Um, in that time frame that I mentioned before, early morning hours of the 14th starting around 5:13 to 5:31, there was numerous calls that had been made from Mr. Boothby's cellphone, and all those calls utilized three towers that were in the Toronto, Iowa, area, and I was able to determine first the physical location of the address of the towers and then I went back and was able to determine what sectors the phone was using for each of those towers.

Officer Schroeder then explained the map admitted as exhibit 12:

This is a Google Earth map that I made. It has Mr. Barten's residence pinpointed on the map up by Spragueville. It has the location of Shawn Barten's trailer west of Toronto. The city of Toronto itself is displayed on this map. The city of Lost Nation, the city of Wheatland, and then there are circles around each of the three towers I mentioned before with lines coming from the center where the towers are out to the edge of the circle to indicate where the sectors were.

Officer Schroeder next described how to interpret the map,

And then if you look at the three pinpoints where the cellphone towers are, you'll see lines coming out from the center there. These are the lines that I used to mark out the different sectors for each of these individual towers. So for example, up here on the tower north of Lost Nation, you can see two lines coming out to the west and to the east and then one to the bottom and then the same for the tower down here in Wheatland.

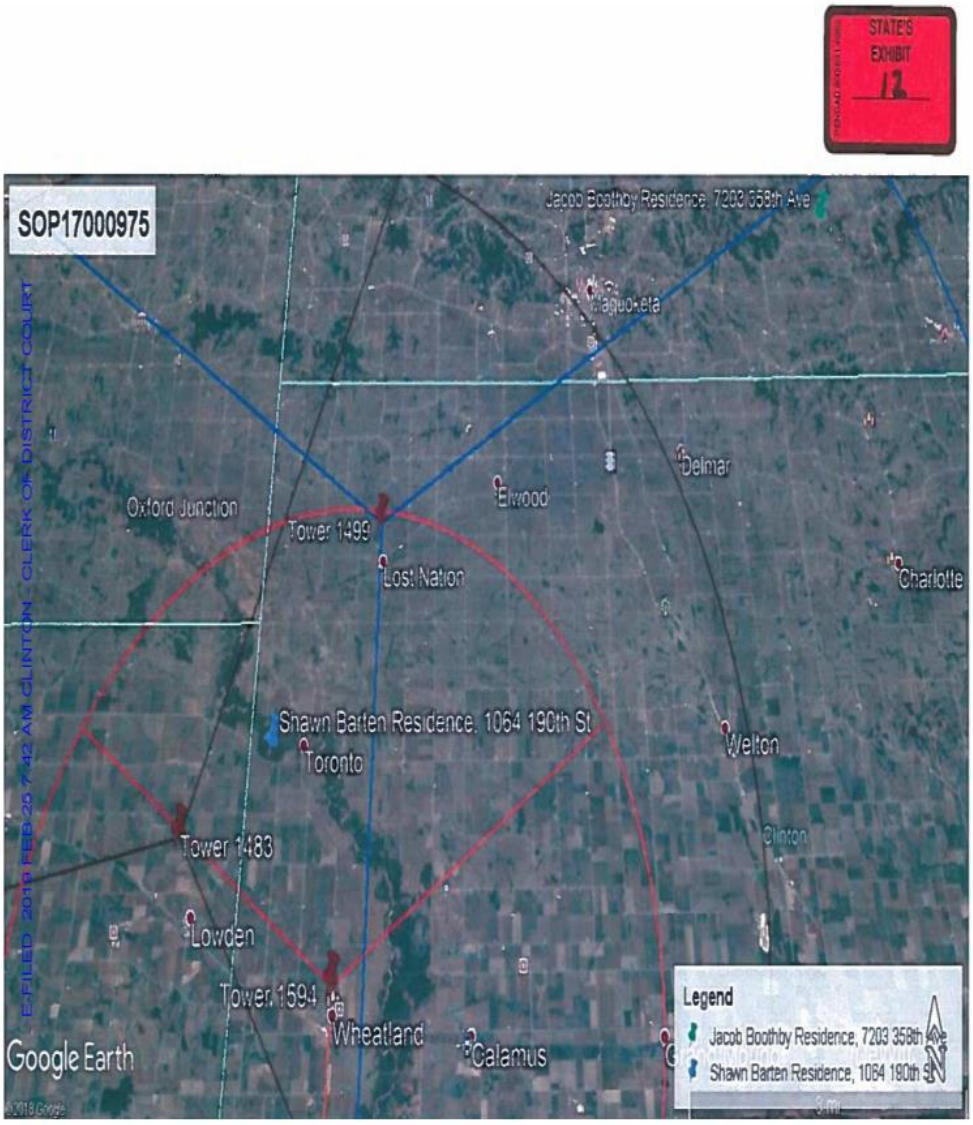
These lines that come out from the center of the tower are just to mark out the sectors and then also the same over here for the tower by Lowden. Now, what I tried to do was make them different colors to try to be able to differentiate them looking at this map because as you can see, some of

them overlay each other. Another thing you will notice is it looks like some of the circles are bigger than others.

U.S. Cellular does provide information of the relative radius range of the towers, and you can measure that using Google Earth, so if you notice here on the tower over by Lowden, there's quite a large circle for that one. You can't actually see it all. U.S. Cellular indicated that the radius range for that, I believe, was maybe 34,000 or 37,000 meters, so usually Google Earth you can measure that out. That's why there's different circles for each of the towers.

The map created by Officer Schroeder is reproduced below.

EXHIBIT 12-GOOGLE MAP IMAGE



Following a discussion of the timing of the calls in the records, the State asked Officer Schroeder to explain specifically what the map meant:

> Q. . . . And then so based on your training and experience, what is this information telling us? A. This information tells me that Mr. Boothby's phone *was in the sectors of those towers* that—where Mr. Barten's residence or the rough location of where the incident occurred. His cellphone was in that area or *in those sectors* on the morning of the 14th.
>
> Q. *Does it give us exact locations? A. No, it does not. The record would only indicate that his phone would be somewhere roughly in those sectors. It cannot pinpoint his exact location.*

(Emphasis added.)

To summarize, Officer Schroeder testified about how he used the U.S. Cellular records to create a map from the Google Earth program that identified Boothby's home address and the address near the incident, three specific cell towers used by Boothby's phone in the minutes leading up to the time of the incident, the direction of the phone from the relevant tower when the call was connected, and the range of each tower as identified by U.S. Cellular. We now look at how other jurisdictions have treated similar testimony to determine whether Officer Schroeder provided expert testimony without being properly qualified to then determine whether Boothby's counsel was ineffective for failing to challenge the testimony on that basis.

C. Survey of Other Jurisdictions' Treatment of Historical Cell Site Date. On the surface, many of the jurisdictions that have considered this question appear divided. However, in recent years, a trend has emerged among courts that have considered whether and when an expert is required to testify about historical cell site data.

Many earlier cases considering this issue held historical cell site data did not require an expert, offering little discussion. *See, e.g.*, *United States v. Baker*, 496 F. App'x 201, 204 (3d Cir. 2012) (concluding that creation of a map using cell site data did not require special knowledge); *United States v. Feliciano*, 300 F. App'x 795, 801 (11th Cir. 2008) (per curiam) (concluding testifying officer did not provide expert testimony but "simply reviewed the cellular telephone records and a summary of those calls, which identified cellular towers for each call, and based on his personal knowledge concerning the locations of certain cellular towers, testified that, at the time of the call, [an accomplice's] cellular telephone was nowhere near the arrest location"); *Perez v. State*, 980 So. 2d 1126, 1131 (Fla. Dist. Ct. App. 2008) (concluding records custodians did not provide expert testimony where they "simply factually explained the contents of phone records" (quoting *Gordon v. State*, 863 So. 2d 1215, 1219 (Fla. 2003) (per curiam))); *State v. Hayes*, No. M2008–02689–CCA–R3–CD, 2010 WL 5344882, at *10 (Tenn. Crim. App. Dec. 23, 2010) ("The detective merely testified that he saw the locations of the cell phone towers listed on the cell phone records and plotted those locations on a map. . . . We conclude that a layperson could plot the locations of the towers on a map and draw the same inference [of location]; therefore, his testimony did not require specialized knowledge . . . and the trial court did not err by allowing the testimony.").

The Maryland Court of Special Appeals reached the opposite conclusion in *Wilder v. State*. 991 A.2d 172, 176 (Md. Ct. Spec. App. 2010) ("[T]he trial court abused its discretion by permitting testimony about cellular tower site location without qualifying the State's witness as an expert . . . ."). After considering many of the cases cited above, the Maryland court concluded "the better approach is to require the

prosecution to offer expert testimony to explain the functions of cell phone towers, derivative tracking, and the techniques of locating and/or plotting the origins of cell phone calls using cell phone records." *Id.* at 198. That court "recognize[d] that cellular telephone technology has become generally understood," but concluded the testifying detective's "testimony implicated much more than mere telephone bills." *Id.* at 199. The court believed that the officer's elaboration on the phone records by use of a software program to "plot the locations from which Wilder used his cell phone" required specialized knowledge or skills, requiring the witness to be qualified as an expert. *Id.* at 199–200.

Maryland's highest court later endorsed this holding in *State v. Payne*. 104 A.3d 142, 154–55 (Md. 2014). That court observed,

> Detective Edwards engaged in a process to derive his conclusion that [the defendant and a co-conspirator's] cell phones communicated through the Menlo Park and Balmoral Towers cell towers that was beyond the ken of an average person; his conclusions regarding the communication path also required that he be qualified as an expert witness.

Id. at 154. The court concluded that the detective needed to be an expert to interpret the cell data and understand how to plot it on a map. *Id.* at 154–55.

More recent cases have addressed the issue in a more nuanced manner, focusing on the specific testimony presented. A federal court in Illinois recognized that some information regarding historic cell site data required expert testimony, while other information did not. *See United States v. Evans*, 892 F. Supp. 2d 949, 953–54 (N.D. Ill. 2012). In *United States v. Evans*, the state sought to use an officer to introduce a map of the location of cell towers pinged by the defendant's phone at specific times and then estimate the general location of the defendant's phone during an eighteen-minute period based on the phone's communications with two

specific cell towers by using "granulization theory." *Id.* at 952. The court concluded that "using Google Maps to plot these locations does not require scientific, technical, or other specialized knowledge and that these exhibits are admissible through lay opinion testimony under Rule 701." *Id.* at 953.

"Understanding how . . . factors affect a cell phone's ability to connect a particular tower, however, cannot be said to be within the perception of the untrained layman," and, therefore, attempting to explain the function of cell towers required expert testimony. *Id.* at 954. Thus, witnesses could

> provide lay opinion testimony concerning (1) the call data records obtained for [the defendant's] phone and (2) the location of cell towers used by [the defendant's] phone in relation to other locations relevant to the crime; but if [they] wish[] to testify concerning . . . how cellular networks operate, i.e., the process by which a cell phone connects to a given tower . . . [they] must first meet the demands of Rule 702 and *Daubert* [*v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593–94, 113 S. Ct. 2786, 2796–97 (1993)].

Id.

The *Evans* court drew its line based on the "process of reasoning" standard identified in the advisory committee rules applied by courts in other situations faced with determining whether testimony was lay or expert. *Id.* at 953–54. Relaying information contained in phone records and using that information to plot locations on a map use a "process of reasoning familiar in everyday life" rather than "reasoning which can be mastered only by specialists in the field." *Id.* (quoting Fed. R. Evid. 701 advisory committee's note to 2000 amendment). It is also consistent with many of the earlier cases cited above that considered the issue.

Since *Evans*, the trend among courts has been to draw a similar line between use of historical cell phone data to generate a map identifying the location of cell towers with which a cell phone pinged at the times identified

in phone records on the one hand and testifying about how a cell tower functions and using that information to locate a cellphone at the time it made a call on the other. In *United States v. Henderson*, the United States Court of Appeals for the Tenth Circuit observed that an officer's "recitation of business records" was not improper expert testimony where "the majority of his statements required nothing more than knowing the meaning of abbreviations." 564 F. App'x 352, 363 (10th Cir. 2014). When asked to provide a conclusion about the location of the defendant based on the data, the officer did not cross the line into expert opinion testimony because he qualified his answer by saying no one used the phone to make a phone call within that tower's range, rather than saying the defendant was in any particular location. *Id.* The Tenth Circuit recognized the officer's testimony merely "reflected the collated call information (including tower and sector) contained in other exhibits (also admitted without objection) with the spatial information contained in" the admitted map exhibit. *Id.* at 363 n.10.

The court later distinguished the *Henderson* holding in *United States v. Yeley-Davis*. 632 F.3d at 683–84. There the court held that a witness who first described how cell phone signals are transmitted and the factors that determine which cell tower a phone will connect to, and then testified a phone was in a particular location using that information, gave expert testimony. *Id.* Like the *Evans* court, the Tenth Circuit drew its line based on whether the "process of reasoning" utilized by the witness was one "familiar in everyday life" or could "be mastered only by specialists in the field." *Id.* at 684 (quoting Fed. R. Evid. 701 advisory committee's note to 2000 amendment).

Missouri courts have come to a similar conclusion. In *State v. Patton*, the defendant to a murder charge claimed to be in his cousin's

house sleeping at the time of the murder. 419 S.W.3d 125, 128–29 (Mo. Ct. App. 2013). The cousin's house was only four miles from the site of the murder, so there was overlapping coverage of cell sites in the area. *Id.* at 132. The court recognized that "[r]eading the coordinates of cell sites from phone records and plotting them on a map is not a scientific procedure or technique, and the *Frye* [*v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923)] standard is not applicable." *Id.* at 130. However, "analysis of the many variables that influence cell site signal strength," which was "actually probative of whether Patton was in one area rather than the other . . . amount[ed] to opinion testimony that is properly the province of an expert." *Id.* at 132. Notably, in *Patton*, the crime site and the defendant's alibi site were both located within the coverage of the overlapping cell towers, and the testimony crossed into expert testimony because opining that a cell phone was closest to the pinged tower to then place him at the crime scene was based on the witness's analysis of the "many variables that influence cell site signal strength." *Id.* The Missouri Supreme Court later endorsed *Patton* in *State v. Blurton*. 484 S.W.3d 758, 771 (Mo. 2016) (en banc).

The Nevada Supreme Court recognized a similar distinction in *Burnside v. State*. 352 P.3d 627, 636–37 (Nev. 2015) (en banc).

> The key to determining whether testimony about information gleaned from cell phone records constitutes lay or expert testimony lies with a careful consideration of the substance of the testimony—does the testimony concern information within the common knowledge of or capable of perception by the average layperson or does it require some specialized knowledge or skill beyond the realm of everyday experience?

Id. at 636. Thus, an officer who created a map identifying the location of cell sites used by the defendants' phones did not need to qualify as an expert to testify about the map. *Id.* However, a Sprint employee, who

explained how cell signals are transmitted and what determines which cell tower has the strongest signal, based his testimony on specialized knowledge gained through his employment, which required him to be qualified as an expert. *Id.* at 636–37.

In reaching a similar conclusion, the New Hampshire Supreme Court offered a unique perspective. In *State v. DePaula*, records custodians employed by major cell phone service providers and a police analyst testified about cell towers as well as a map with plotted cell tower pings. 166 A.3d 1085, 1090 (N.H. 2017). In determining whether these witnesses provided lay or expert testimony, the court noted it had "previously found that individuals can present limited lay testimony regarding matters which, if discussed in detail, would require expert testimony." *Id.* at 1098 (discussing the horizontal gaze nystagmus test used for determining whether a person is under the influence of alcohol). The court reasoned that just as an officer who testifies about performing a horizontal gaze nystagmus test but does not understand the neurological processes testifies as a lay witness, so too an officer presenting testimony of historical cell site data without addressing the inner workings of the towers presented only lay testimony. *Id.*

Many other jurisdictions have come to the same or a substantially similar conclusion, including Ohio, *State v. Johnson*, 110 N.E.3d 800, 807 (Ohio Ct. App. 2018) ("Testimony regarding a comparison of cell phone data records to locations where crimes occurred does not require 'specialized knowledge, skill, experience, training, or education' regarding cellular networks." (quoting *State v. Daniel*, 57 N.E.3d 1203, 1218 (Ohio Ct. App. 2016))), New Mexico, *State v. Carrillo*, 399 P.3d 367, 376 (N.M. 2017) ("Had the State limited [the records custodian's] testimony to just the call detail report record and the cell tower report, we would find no

error. However, [the custodian] proceeded to testify about how cell towers operate and interact with cell signals to locate the general origin of a cell phone call. This second category of testimony requires the 'scientific, technical, or other specialized knowledge' to assist 'the trier of fact to understand the evidence or determine a fact in issue.' " (quoting New Mexico R. Evid. 11-702)), and Maine, *State v. Wyman*, 107 A.3d 641, 648 (Me. 2015) ("A witness who testifies to the contents of cell phone billing records should be qualified as an expert if her testimony employs some form of specialized knowledge. Specialized knowledge is not necessary, however, when a witness conveys only the factual information displayed on cell phone billing records." (footnote omitted)).

Kansas confronted the issue most recently in *State v. Timley*. 469 P.3d 54, 61 (Kan. 2020). The Kansas court discussed *Patton* and *Blurton* and concluded the detective's "testimony was much more akin to *Blurton* than to *Patton*." *Id.* at 62.

> As in *Blurton*, [the detective] input the Sprint data—which was, itself, admitted without objection—into a program in order to more comprehensibly digest the information, i.e., to produce maps. [The detective] did not definitively represent that Timley *was* present at any given point at any given time—just that his phone connected to particular towers at particular times and from particular directions, as depicted on the maps generated from the Sprint data. According to [the detective], Timley's phone had to have been somewhere in the direction of the cone emanating from each tower on the exhibits—if not necessarily the area of the cone—regardless of whether other towers were overburdened.

Id. Therefore, the detective's testimony was properly admitted as lay testimony. *Id.*

Some courts recognize there is a line to be drawn but seemingly move it closer to the expert side in more situations by precluding lay testimony beyond the mere recitation of information contained in the

phone records. *See State v. Edwards*, 156 A.3d 506, 521, 522–23, 526 (Conn. 2017) (holding a witness who testified about the "azimuth" and "bismuth" of coverage areas acted as an expert when the witness "relied on data he obtained from Verizon to conduct his analysis, the process he used to arrive at his conclusions was beyond the ken of average juror[, and] even the trial court acknowledged that [the witness] had an expertise that allowed him to be more knowledgeable on the subject of cell phone data than the average juror"); *Collins v. State*, 172 So. 3d 724, 743 (Miss. 2015) (en banc) (recognizing "testimony that simply describes the information in a cell phone record . . . [or] merely informs the jury as to the location of cell phone towers" is proper lay testimony but "agree[ing] with the Maryland Court of Appeals that the better approach is to require 'expert testimony to explain the functions of cell phone towers, derivative tracking, and the techniques of locating and/or plotting the origins of cell phone calls using cell phone records' " (quoting *Wilder*, 991 A.2d at 198)).

In *United States v. Natal*, the Second Circuit observed that it "need not hold that *all* evidence related to cell phone towers necessarily requires expertise," but the court went on to "caution that the line between testimony on how cell phone towers operate, which must be offered by an expert witness, and any other testimony on cell phone towers, will frequently be difficult to draw." 849 F.3d 530, 536 (2d Cir. 2017) (per curiam). The court advised "both litigants and district courts . . . to consider seriously the potential need for expert testimony." *Id.*

Yet other courts seemingly require an expert to testify about any historic cell site data. In many of these cases, testimony was presented through an expert below, and reviewing courts endorsed that decision without much discussion. *See, e.g.*, *United States v. Reynolds*, 626 F. App'x 610, 613–14 (6th Cir. 2015); *United States v. Schaffer*, 439 F. App'x

344, 346 (5th Cir. 2011) (per curiam); *United States v. Machado-Erazo*, 950 F. Supp. 2d 49, 52 (D.D.C. 2013), *aff'd*, 901 F.3d 326 (D.C. Cir. 2018); *United States v. Jones*, 918 F. Supp. 2d 1, 4 (D.D.C. 2013); *People v. Hollinquest*, 119 Cal. Rptr. 3d 551, 559–60 (Ct. App. 2010); *State v. Marinello*, 49 So. 3d 488, 509–10 (La. Ct. App. 2010); *Francis v. State*, 781 N.W.2d 892, 895 (Minn. 2010); *Commonwealth v. Bryant*, 67 A.3d 716, 722 (Pa. 2013). While other courts question whether such evidence should ever be introduced by lay witnesses, their ultimate holding is consistent with the *Evans* line. *See, e.g.*, *United States v. Hill*, 818 F.3d 289, 295–96 (7th Cir. 2016) ("Agent Raschke's testimony in this case included statements about how cell phone towers operate. In our view, this fits easily into the category of expert testimony . . . .").

The West Virginia Supreme Court of Appeals rejected the *Evans* line in *State v. Johnson*. 797 S.E.2d 557, 566 (W. Va. 2017). The state called a deputy as a witness and asked in-depth questions about the operations of cell towers, including discussion of "beamwidth" and "NEID numbers." *Id.* at 566–69. In particular, the deputy testified

> that cell phone calls and text messages belonging to [the defendant, her co-conspirators, and the victim] were made in the vicinity of cell towers that were near the crime scene. With respect to [the defendant], based upon this testimony, the jury could infer that she was in the area of the crime scene near the time of the murder.

Id. at 560 (footnote omitted). After discussing both *Evans* and *Payne*, the West Virginia court declined to follow *Evans* "because lay 'witnesses . . . not only read the records to the jury, but the[y] dr[a]w the ultimate conclusion that the records could show the caller was in a specific location[.]' " *Id.* at 565–66 (alterations in original) (quoting Wells at 511). Ultimately, the court held "that a witness must be qualified as an expert under Rule 702 of the West Virginia Rules of Evidence in order to present

evidence of cell phone historical cell site data." *Id.* at 566. The court rejected the state's characterization of the officer's testimony as merely relating facts gleaned from the stipulated phone records where the officer testified at least four times that his testimony was based on his training, including training specific to cell tower mapping. *Id.* at 569.

D. Application to Officer Schroeder's Testimony. Having surveyed the various approaches, we agree with the growing majority of jurisdictions that draw the line between lay and expert testimony involving historical cell site data based on the underlying information supporting the testimony. If the witness conveys inferences that can be drawn from factual information contained in the phone records using "a process of reasoning familiar in everyday life," such as plotting data on a map, the testimony qualifies as lay testimony. This includes opinions about the generalized location of a phone within the coverage area of the pinged tower—as long as the opinion is premised on factual information from the phone company. However, when a witness relies on specialized knowledge about how a cell tower functions, such as the numerous factors that determine why a phone pings off one cell tower instead of another, to opine about the coverage area of a tower or a cell phone's location, that witness must first be qualified as an expert.

We recognize this may be a fine distinction,[2] but it is a logical one recognized by a number of courts and the federal rules commentary

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[2]Other courts have recognized the distinction between Rule 701 and 702 is a fine one. *See United States v. Perkins*, 470 F.3d 150, 155 (4th Cir. 2006) ("[T]he line between lay opinion testimony under Rule 701 and expert testimony under Rule 702 'is a fine one[.]' " (quoting 3 Stephen A. Saltzburg, Michael M. Martin & Daniel J. Capra, *Federal Rules of Evidence Manual* 701–14 (9th ed. 2006))); *United States v. Ayala–Pizarro*, 407 F.3d 25, 28 (1st Cir. 2005) ("[T]he line between expert testimony under [Federal Rule of Evidence] 702 . . . and lay opinion testimony under [Federal Rule of Evidence] 701 . . . is not easy to draw." (first and third alteration in original) (quoting *United States v. Colón Osorio*, 360 F.3d 48, 52–53 (1st Cir. 2004))).

explaining the purpose for the scientific, technical, or specialized knowledge distinction between expert and lay testimony. The rules created that distinction "to eliminate the risk that the reliability requirements set forth in Rule 702 will be evaded through the simple expedient of proffering an expert in lay witness clothing." Fed. R. Evid. 701 advisory committee's note to 2000 amendment. Even so, rule 702 "does not interdict all inference drawing by lay witnesses.' " *United States v. Graham*, 796 F.3d 332, 364 (4th Cir. 2015) (quoting *United States v. Perkins*, 470 F.3d 150, 156 (4th Cir. 2006), *rev'd on other grounds*, 824 F.3d 421 (4th Cir. 2016) (en banc)). Limiting a lay witness's testimony to inferences drawn from facts using "reasoning familiar in everyday life" eliminates reliability concerns because a juror is able to use her own reasoning to evaluate the witness's opinion. The same is not true when an expert witness testifies based on "scientific, technical, or specialized knowledge" that is outside the understanding of an average juror's reasoning. In that case, the expert witness's qualifications become much more important to a juror's ability to evaluate his testimony. *See, e.g.*, *Ranes v. Adams Lab'ys, Inc.*, 778 N.W.2d 677, 686 (Iowa 2010) (discussing district courts' "well-recognized role as guardians of the integrity of expert evidence" by evaluating the "witness's qualifications and the reliability of the witness's opinion" as part of the court's gatekeeping function).

Here, Officer Schroeder testified that he identified calls placed from Boothby's phone between approximately 5:13 a.m. and 5:31 a.m., around the time of the incident. That testimony relayed only facts contained in the phone records. Similarly, when he identified from the phone records which sector of which cell tower each phone call pinged, along with the physical address of each cell tower, Officer Schroeder relayed factual information that required nothing more than knowing what the codes

meant in the phone records contained in exhibit 10 and the corresponding cell tower records contained in exhibit 11. *See Henderson*, 564 F. App'x at 363 (noting "the majority of [the officer's] statements required nothing more than knowing the meaning of abbreviations"). Likewise, Officer Schroeder presented factual information when he platted the location of Boothby's residence, the location of the incident near Barten's house, and the location of three cell towers on a Google Earth map. Each of those facts involved nothing more than entering street addresses into the Google Earth map program. *See Hayes*, 2010 WL 5344882, at *10 ("The detective merely testified that he saw the locations of the cell phone towers listed on the cell phone records and plotted those locations on a map. . . . [A] layperson could plot the locations of the towers on a map . . . .").

In identifying the location of the three sectors for each of the three cell towers and drawing them on the map, Officer Schroeder testified exhibit 11 "provides information for each tower as to where each sector starts. It goes by degrees in the 360-degree circle, so you can roughly show where the sectors start and end for the three sectors for each tower." With respect to drawing the circles around each tower to identify their respective coverage areas, Officer Schroeder testified

> U.S. Cellular does provide information of the relative radius range of the towers, and you can measure that using Google Earth . . . . U.S. Cellular indicated that the radius range for [the tower near Lowden], I believe, was maybe 34,000 or 37,000 meters, so usually Google Earth you can measure that out.

A careful review of Officer Schroeder's testimony reveals he merely used factual data from U.S. Cellular identifying the relative radius range for each specific tower and Google Earth's measurement features to identify the sectors and create a circle representing the coverage radius around each tower. *See Smith*, 591 F.3d at 983 (requiring "a case-by-case

analysis of both the witness and the witness[]'s opinion"); *Burnside*, 352 P.3d at 636 ("The key to determining whether testimony about information gleaned from cell phone records constitutes lay or expert testimony lies with a careful consideration of the substance of the testimony . . . ."). This testimony distinguishes this case from *Collins v. State*, where the officer "never testified regarding how he determined the service area of each antenna or that it was the actual service area." 172 So. 3d at 740.

The Kentucky Supreme Court recently concluded similar evidence presented lay rather than expert testimony in *Torrence v. Commonwealth*. 603 S.W.3d 214, 223–25, 228 (Ky. 2020). Torrence was charged with assault following a shooting at a Louisville residence. *Id.* at 216. Torrence claimed he was picking up his daughter eleven miles away at the time of the shooting. *Id.* at 217. Detective Snider described the cell site records he subpoenaed and explained how the records identified the cell towers Torrence's phone used to place two calls as well as "a directional degree reading based on a 360-degree circle or compass . . . [that] indicated the direction of the call or text relative to the tower." *Id.* at 224.

Using a Google Maps program displayed to the jury, Detective Snider plotted the location of the towers used to make the calls, the location of the shooting, and the location where Torrence claimed he picked up his daughter. *Id.* Detective Snider then drew a "pie wedge" for each call, showing the direction of the phone from each cell tower when it interacted with the tower. *Id.* The Court agreed that "anyone could read the records, open a Google™ Maps program on a computer, enter the addresses, locations, or coordinates including latitude and longitude, and obtain the same results . . . [which] meant Detective Snider's testimony qualified as lay testimony." *Id.* at 225; *cf. Patton*, 419 S.W.3d at 131 (recognizing that while historical cell tower records cannot be used to specifically locate a

phone, they do "indicate that a phone was located somewhere within a cell site's geographic coverage area").

Given the strictly factual basis for Officer Schroeder's identification of the sectors and radius range for each tower, such testimony qualified as lay testimony.

When then asked to opine about what these facts meant, Officer Schroeder was careful to qualify his opinion about whether Boothby's phone was in the area of the incident. He testified only that the phone "was *in the sectors of those towers* that—where Mr. Barten's residence *or the rough location* of where the incident occurred. His cellphone was in that area or *in those sectors* on the morning of the 14th." (Emphasis added.) When asked if the map gave exact locations, Officer Schroeder testified, "No, it does not. The record would only indicate that his phone would be somewhere roughly in those sectors. It cannot pinpoint his exact location."

This testimony stayed on the lay opinion side of the line. Officer Schroeder confined his testimony to identifying the location of cell towers pinged by Boothby's phone, the direction of Boothby's phone from the towers when it pinged on them, and the radius range for each tower. Importantly, Officer Schroeder did not base his opinion on how cellular technology works but only on the factual data received from U.S. Cellular. *See Graham*, 796 F.3d at 364–65 ("[The records custodian's] testimony as to cell sites' range of operability required no greater than the same minimal technical knowledge. The district court did not abuse its discretion in admitting this testimony by a lay witness."); *Blurton*, 484 S.W.3d at 772 (holding witnesses who confined their testimony to the general trajectory of the phone and did not attempt "to pinpoint the defendants' exact location within a small geographic area" did not need to be qualified as

experts because a lay "witness could still reasonably infer Mr. Blurton's general path of travel from Garnett to Cole Camp without using specialized skill or knowledge").

Having reviewed Officer Schroeder's specific testimony, we conclude it was based on factual information obtained from the U.S. Cellular records rather than any specialized knowledge about how cell towers operate and resulted from "a process of reasoning familiar in everyday life." *Evans*, 892 F. Supp. 2d at 953 (quoting Fed. R. Evid. 701 advisory committee's note to 2000 amendment). Officer Schroeder presented only lay testimony, and Boothby's claim that his counsel was ineffective for failing to challenge his qualifications as an expert necessarily fails.

We nonetheless echo the Second Circuit's "caution that the line between testimony on how cell phone towers operate, which must be offered by an expert witness, and any other testimony on cell phone towers, will frequently be difficult to draw." *Natal*, 849 F.3d at 536. While Officer Schroeder aptly walked the tight line in this case, the large, rural area and the distance between relevant locations aided his ability to do so.

V. Conclusion.

Boothby's counsel was not ineffective for failing to challenge the phone records or Officer Schroeder's testimony because the challenges would have been unsuccessful. We therefore vacate the court of appeals' decision preserving the ineffective-assistance claims for postconviction-relief proceedings and affirm Boothby's conviction.

DECISION OF COURT OF APPEALS VACATED; DISTRICT COURT CONVICTION AFFIRMED.