



# PUBLIC NOTICE

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FCC 22-42  
Released: June 9, 2022

## FEDERAL COMMUNICATIONS COMMISSION SEEKS TO REFRESH THE RECORD ON LOCATION-BASED ROUTING FOR WIRELESS 911 CALLS

PS Docket No. 18-64

Comments Due: July 11, 2022  
Reply Comments Due: July 25, 2022

By the Commission: Chairwoman Rosenworcel and Commissioner Starks issuing separate statements.

With this Public Notice, we invite parties to update the record on issues raised in the 2018 *Location-Based Routing for Wireless 911 Calls Notice of Inquiry (Notice of Inquiry)*,<sup>1</sup> which sought comment on the feasibility of location-based routing as a means of reducing the incidence of misrouted wireless calls to 911 and improving emergency response times. The prior comment and reply comment period in this proceeding closed nearly four years ago.<sup>2</sup> Given the passage of time since the prior comment period ended, enhancements in 911 location accuracy, and intervening developments related to location-based routing, we now seek to update the record in this proceeding. We seek comment on technological improvements to location-based routing, as well as the extent to which wireless carriers have deployed location-based routing in their networks. We also seek to update the record on steps the Commission could take to encourage the implementation of location-based routing or other improvements that would help to reduce misrouting of 911 calls and improve emergency response.

*2018 Notice of Inquiry.* In the *Notice of Inquiry*, the Federal Communications Commission (FCC or Commission) stated that transitioning from cell tower-based routing to location-based routing would significantly reduce the number of wireless 911 calls that must be transferred from one Public Safety Answering Point (PSAP) to another and therefore that it “would be in the public interest and should be encouraged and actively facilitated.”<sup>3</sup> The Commission sought comment on issues related to wireless 911

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<sup>1</sup> *Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64, Notice of Inquiry, 33 FCC Rcd 3238 (2018) (*Notice of Inquiry*).

<sup>2</sup> Comments in response to the 2018 *Notice of Inquiry* were due by May 7, 2018. *Notice of Inquiry*, 33 FCC Rcd at 3238. Reply comments were due by June 28, 2018. *Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64, Order, 33 FCC Rcd 4514 (2018).

<sup>3</sup> *Notice of Inquiry*, 33 FCC Rcd at 3240, para. 4. Typically, wireless carriers route a 911 call to a PSAP based on the location of the cell sector that receives the call. *Id.* at 3240, para. 8. Due to the necessarily imprecise nature of cell sector-based routing, networks may route a wireless 911 call to a PSAP other than the one designated by the relevant 911 authority for the actual location of the caller. Cell sector-based routing can fail to route a 911 call to the appropriate PSAP for several reasons, including that more than one PSAP may be within the coverage area of a cell sector. Communications Security, Reliability and Interoperability Council V (CSRIC V), Working Group 1, (continued....)

call misroutes and the current state of the implementation of location-based routing technologies, including existing standards and location-based routing capabilities in the context of Next Generation 911 (NG911).<sup>4</sup> The Commission also asked detailed questions on the findings and recommendations regarding routing approaches identified in the report on location-based routing of the Communications Security, Reliability and Interoperability Council V (*CSRIC V LBR Report*).<sup>5</sup> Additionally, the Commission requested that commenters discuss the means available to the Commission to facilitate improvements to 911 routing and reduce the likelihood of misrouted 911 calls, including the promotion of voluntary best practices, implementation of incentive-based mechanisms, or regulatory action, and other costs and benefits relating to location-based routing for Enhanced 911 (E911).<sup>6</sup> The Commission received 22 comments and 14 reply comments.<sup>7</sup>

*Developments Since 2018.* We issue this *Public Notice* so that commenters may update the record to address developments of the last four years, which, as discussed below, include new studies on misroutes and location-based routing technology, increased deployment of device-based hybrid (DBH)<sup>8</sup>

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Evolving 911 Services, Final Report – Task 2: 911 Location-Based Routing at 9 (2016) (*CSRIC V LBR Report*), [https://transition.fcc.gov/bureaus/pshs/advisory/csric5/WG1\\_Task2\\_FinalReport\\_092016.docx](https://transition.fcc.gov/bureaus/pshs/advisory/csric5/WG1_Task2_FinalReport_092016.docx). The Commission considers such calls to be “misrouted.” *Notice of Inquiry*, 33 FCC Rcd at 3239, para. 2. In addition, it is important to note that the misroutes that are the subject of this inquiry generally result from current 911 call routing mechanisms that rely on cell tower location and are working as designed, not from technical failure of those mechanisms. *Id.* at 3239, para. 2 n.1. Calls misrouted to a jurisdiction that cannot dispatch assistance must be transferred, a process that consumes time and resources for both the first and second PSAP and delays dispatch and the ability of first responders to render aid. *Id.* at 3239, 3240-41, paras. 2, 8. In 2016, CSRIC V identified that location-based routing methods could be used to deliver a 911 call to a jurisdictionally appropriate PSAP and thereby reduce required call transfers, as long as the technology could obtain a location fix in 5 seconds or less. *CSRIC V LBR Report* at 3. CSRIC V defined location-based routing as “a system of rules to varying degrees of complexity dictating to where 9-1-1 calls from various locations are routed.” *CSRIC V LBR Report* at 6-7.

<sup>4</sup> *Notice of Inquiry*, 33 FCC Rcd at 3246-51, paras. 17-33. The *Notice of Inquiry* sought information on the routing of wireless 911 calls, noting that advances in location technology could support initial call-routing based on a caller’s actual location. *Id.* at 3240, para. 3. The Commission also noted that while many location-based routing methods were promising, uncertainty remained regarding their reliability, the time required to develop necessary standards, and the potential transition costs of implementing location-based routing on current wireless 911 systems. *Id.* at 3240, para. 4.

<sup>5</sup> *Notice of Inquiry*, 33 FCC Rcd at 3246-50, paras. 18-29. The five methods of location-based routing identified by CSRIC V include: (1) holding 911 calls until Phase II location data becomes available; (2) an “interim or quick fix” method that would hold calls at a wireless MSC or the PSAP gateway for up to six seconds to allow the wireless carrier time to deliver X/Y coordinates; (3) registered or provisioned civic address for certain devices; (4) device-based hybrid location; and (5) wireless 911 location accuracy emerging technologies. See *CSRIC V LBR Report* at 10-23.

<sup>6</sup> *Notice of Inquiry*, 33 FCC Rcd at 3251-53, paras. 34-42.

<sup>7</sup> Commenters included, among others, national public safety entities, state and regional 911 entities, nationwide carriers, emergency telecommunications service providers, a handset manufacturer, a technical standards organization, a public safety consulting firm, and concerned members of the public. Commenters offered varying opinions about whether technologies were capable of location-based routing without delaying 911 calls. See, e.g., AT&T Services, Inc. (AT&T) Reply Comments at 7-8, 11-12 (arguing that the Commission should “proceed cautiously,” as “[e]ven the most promising of location based technologies... have limits”); Motorola Solutions, Inc. Comments at 2 (asserting that testing has confirmed that location-based wireless routing is faster and more accurate than legacy wireless routing). The comments and reply comments in response to the *Notice of Inquiry* may be viewed at: [https://www.fcc.gov/ecfs/search/search-filings/results?q=\(proceedings\\_name:\(“18-64”\)\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(proceedings_name:(“18-64”))).

<sup>8</sup> Device-based hybrid location is an estimation method that typically utilizes either a selection or a combination of location methods available to the handset in a given environment, including crowd-sourced Wi-Fi, A-GNSS, and  
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location technologies, and implementation of location-based routing on wireless carrier networks. In 2018, CTIA announced that the nationwide wireless carriers planned to add DBH location technologies to their networks to improve 911 location accuracy.<sup>9</sup> In 2019, the Alliance for Telecommunications Industry Solutions (ATIS) published two studies with new information on misrouting and the feasibility of location-based routing.<sup>10</sup> In those studies, ATIS concluded that “location-based routing is technically feasible within the timing considerations recommended by CSRIC V,”<sup>11</sup> and evaluated where “sub-optimal routing” occurred for a sample set of emergency calls.<sup>12</sup> In a 2019 *ex parte* filing in the instant docket, Apple Inc. noted that it had made DBH location technology available on certain device models that would support carrier implementation of location-based routing.<sup>13</sup> In 2020, T-Mobile launched location-based routing on its network in Texas and Washington state.<sup>14</sup> In 2022, AT&T announced a plan for a nationwide rollout of location-based routing on its network.<sup>15</sup> In addition to these industry developments, the reported total of state expenditures on NG911-related programs has increased from \$228 million to over \$364 million since 2018.<sup>16</sup> The Commission has also taken steps to improve vertical location accuracy for wireless 911 calls and dispatchable location for fixed telephony, interconnected Voice-over-Internet Protocol (VoIP) services, Telecommunications Relay Services (TRS), and mobile text service.<sup>17</sup> More recently, the Association of Public-Safety Communications Officials, International (APCO) has urged the Commission to address location-based routing as part of a proceeding on NG911.<sup>18</sup>

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possibly other handset-based sensors. It also includes an associated uncertainty estimate reflective of the quality of the returned location. *CSRIC V LBR Report* at 16.

<sup>9</sup> Press Release, CTIA, Wireless Industry Announces Development in Improving 9-1-1 Location Accuracy (Sept. 5, 2018), <https://www.ctia.org/news/wireless-industry-announces-development-in-improving-9-1-1-location-accuracy>.

<sup>10</sup> The Alliance for Telecommunications Industry Solutions (ATIS) completed two studies in July 2019. *See* ATIS, Enhancing Location-Based Routing of Emergency Calls, ATIS-0700042 (Jul. 2019) (*ATIS-0700042*), [https://www.techstreet.com/atis/standards/atis-0700042?product\\_id=2077662](https://www.techstreet.com/atis/standards/atis-0700042?product_id=2077662); ATIS, Analysis of Predetermined Cell Sector Routing Outcomes Compared to Caller’s Device Location, ATIS-0500039 (Jul. 2019) (*ATIS-0500039*), [https://www.techstreet.com/standards/atis-0500039?product\\_id=2078062](https://www.techstreet.com/standards/atis-0500039?product_id=2078062).

<sup>11</sup> *ATIS-0700042* at 22.

<sup>12</sup> *ATIS-0500039* at 1.

<sup>13</sup> Letter from Paul Margie, Counsel for Apple Inc., to Marlene H. Dortch, Secretary, FCC, PS Docket No. 18-64 et al. (filed Sept. 24, 2019). Apple shared in an *ex parte* meeting that it offers wireless carriers the option to enable location-based routing for iPhone models 6s and later running iOS 13 and Apple Watch devices running watch OS 6. *Id.* at 2.

<sup>14</sup> T-Mobile USA, Inc. (T-Mobile), T-Mobile First to Roll Out Cutting-Edge 911 Capabilities (Dec. 17, 2020), <https://www.t-mobile.com/news/network/tmobile-next-generation-911-location-based-routing>.

<sup>15</sup> AT&T, AT&T Launches First-Ever Nationwide Location-Based Routing (May 10, 2022), <https://about.att.com/story/2022/nationwide-location-based-routing.html#:~:text=With%20location%2Dbased%20routing%2C%20a,to%20a%2010%2Dmile%20radius>.

<sup>16</sup> *See* FCC, Eleventh Annual Report to Congress on State Collection and Distribution of 911 and Enhanced 911 Fees and Charges at 43, para. 34 (2019) (covering financial year 2018), <https://www.fcc.gov/files/11thannual911feereport2019pdf>; FCC, Thirteenth Annual Report to Congress on State Collection and Distribution of 911 and Enhanced 911 Fees and Charges at 62, para. 57 (2021) (covering financial year 2020), <https://www.fcc.gov/sites/default/files/13th-annual-911-fee-report-2021.pdf>.

<sup>17</sup> *See, e.g., Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Fifth Report and Order and Fifth Further Notice of Proposed Rulemaking, 34 FCC Rcd 11592 (2019), corrected by Erratum (PSHSB Jan. 15, 2020); *Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, Sixth Report and Order and Order on Reconsideration, 35 FCC Rcd 7752 (2020), corrected by Erratum (PSHSB Aug. 28, 2020) and Second Erratum, 35 FCC Rcd 125025 (PSHSB Oct. 29, 2020); *Implementing Kari’s Law and Section 506 of RAY BAUM’S Act; 911 Access, Routing, and Location in Enterprise Communications Systems; Amending the Definition of Interconnected* (continued....)

In light of these industry trends, regulatory changes, and NG911 investments, we ask commenters to refresh the record regarding these and any other developments since the Commission's issuance of the *Notice of Inquiry* in the relevant technology, operations, industry standards, or public expectations. More specifically, we seek information regarding the current state of play of cell sector-based misroutes, the implementation of location-based routing by wireless carriers, interdependencies of location-based routing and NG911 to optimize emergency response, location-based routing technology, the use of location-based routing for text-to-911, security considerations of location-based routing, the means available to the Commission to improve 911 routing, and related costs and benefits.

*Cell Sector-Based Misroutes.* In the *Notice of Inquiry*, the Commission sought comment on the frequency of 911 call misrouting and its impact on public safety, as “[a]ny solution to the problem of misrouted 911 calls must be preceded by a determination of the dimensions of the problem.”<sup>19</sup> We seek updated information relating to the extent of the problem of cell sector-based misroutes. How many calls are misrouted on a yearly basis? What proportion of wireless 911 calls are delayed due to the need to reroute them to the correct PSAP and what is the typical length of such delays? For example, does the time required to locate the correct PSAP and reroute the call typically take at least a minute? Is the time required to reroute misrouted calls rising, declining, or staying constant over time? We also seek to update the record on any additional information that would help characterize the problem of cell sector-based misroutes.<sup>20</sup> Beyond the studies described above, have there been additional studies identifying locations or characteristics of locations where misroutes tend to occur?<sup>21</sup> Has the implementation of 5G technologies impacted the prevalence of misroutes from cell sector-based routing and, if so, how?<sup>22</sup>

*Wireless Carrier Implementation of Location-Based Routing.* We seek comment on the current implementation of location-based routing on wireless carrier networks. Commenters should specify to what extent location-based routing solutions have been implemented, the experience of PSAPs receiving wireless 911 calls via these solutions, the strengths and shortfalls experienced during implementation or testing, and any reasons why implementation of location-based routing would not be achievable. We also

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*VoIP Service in Section 9.3 of the Commission's Rules*, PS Docket Nos. 18-261 and 17-239, GN Docket No. 11-117, Report and Order, 34 FCC Rcd 6607 (2019), corrected by Erratum, 34 FCC Rcd 11073 (PSHSB Dec. 2, 2019).

<sup>18</sup> Association of Public-Safety Communications Officials, International (APCO) Comments, PS Docket No. 21-479 at 2-4 (noting that “[l]ocation-based routing can be implemented by the carriers without imposing additional costs on ECCs [(Emergency Communications Centers)] and without having an ESInet [(Emergency Services IP Network)] in place,” and urging the Commission to require wireless service providers to support location-based routing), [https://www.fcc.gov/ecfs/file/download/DOC-5f9cb35edac00000-A.pdf?file\\_name=APCO%20comments%20NASNA%20NG911%20Petition%201.19.2022.pdf](https://www.fcc.gov/ecfs/file/download/DOC-5f9cb35edac00000-A.pdf?file_name=APCO%20comments%20NASNA%20NG911%20Petition%201.19.2022.pdf); see also *Public Safety and Homeland Security Bureau Seeks Comment on Petition for Rulemaking Filed by the National Association of State 911 Administrators*, PS Docket 21-479, Public Notice, DA 21-1607 (PSHSB Dec. 20, 2021). APCO also filed an *ex parte* regarding the circulation draft of this *Public Notice*. Letter from Jeffrey S. Cohen, Chief Counsel, APCO, to Marlene H. Dortch, Secretary, FCC, PS Docket No. 18-64 (filed June 1, 2022) (*APCO Ex Parte*).

<sup>19</sup> *Notice of Inquiry*, 33 FCC Rcd at 3246, para. 17.

<sup>20</sup> See, e.g., Texas 9-1-1 Entities Comments at 5-6 (indicating that the prevalence of misroutes varies greatly between cell sectors for one emergency network in Texas).

<sup>21</sup> For example, *ATIS-0500039* indicates that misroutes tend to arise in locations with particular characteristics, such as along PSAP boundaries, in areas having a dense concentration of PSAPs, for PSAPs fully surrounded by another PSAP, around major water features, and along narrow strips of jurisdictional territory. *ATIS-0500039* at 12-13.

<sup>22</sup> See, e.g., Texas 9-1-1 Entities Comments at 8; Comtech Telecommunications Corp. Comments at 8; National Emergency Number Association (NENA) Reply Comments at 2.

seek comment on whether wireless carrier plans and timelines for implementing location-based routing vary depending on whether PSAPs are using legacy E911 technology, are transitioning to NG911 (i.e., have implemented discrete NG911 elements, such as ESInets, but have not fully implemented NG911),<sup>23</sup> or have achieved full end-state NG911 with all elements included. Does the implementation of location-based routing differ in legacy, transitional, and full NG911 environments, and if so, how? Have wireless carriers conducted any new testing or trials of location-based routing in cooperation with PSAPs, state or regional 911 authorities, or technology vendors? What are the one-time and ongoing costs for wireless carriers implementing location-based routing solutions in legacy E911, transitional, and full NG911 environments, including costs related to updating system architecture, testing, ongoing operation, and satisfying security requirements? Are there costs for PSAPs when wireless carriers implement location-based routing? If so, what are they? Where location-based routing is deployed, what solutions are used, and how well do these solutions perform? In such areas, what percentage of calls are routed using location-based routing versus cell-sector routing? What has been the impact on the number of misroutes, that is, did implementing location-based routing increase, decrease, or have no effect the number of misroutes? What obstacles remain for wireless carriers implementing location-based routing? To what extent have small carriers implemented location-based routing solutions? Are there specific considerations for small carriers with respect to implementing location-based routing for 911 calls?

We also seek comment on any planned implementation of location-based routing on wireless carrier networks. As noted above, AT&T recently announced that it plans to deploy location-based routing nationwide, without regard to whether transitional NG911 has been deployed. Do other wireless carriers plan to implement or expand location-based routing on their networks? If so, on what timelines, and what are the criteria for determining when and where to expand location-based routing? How if at all is location-based routing different for PSAPs that are not connected to an ESInet? What is required for wireless carriers to implement location-based routing in legacy E911 environments, transitional, and full NG911 environments, including standards, costs, and network components? On what timelines could wireless carriers implement location-based routing in legacy E911, transitional, and NG911 environments?

*Transitions to Next Generation 911 and Location-Based Routing.* We seek further comment on the interdependencies of location-based routing technologies and NG911 to optimize emergency response. For example, the Commission observed in the *Notice of Inquiry* that the adoption of location-based routing could provide an incentive for PSAPs and wireless carriers to transition to NG911, because NG911 systems are designed to route calls using caller location obtained in real time.<sup>24</sup> Commenters responding to the *Notice of Inquiry* provided diverse opinions regarding whether the implementation of location-based routing should proceed independently of NG911.<sup>25</sup> Has the availability of location-based

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<sup>23</sup> See APCO *ex parte* at 1 (noting that “transitional NG9-1-1’ environments entail the deployment of emergency services IP networks (ESInets) that are intended to implement some call-delivery elements of an end-state NG9-1-1 environment”). See also CSRIC VII, Working Group 4, Report on Security Risks and Best Practices for Mitigation in 9-1-1 in Legacy, Transitional, and NG 9-1-1 Implementations at 4-5, 12-14 (2020) (stating that transitional NG911 “assumes that the Emergency Services IP Network (ESInet) is in place supported by the associated Next Generation 9-1-1 Core Services that are within the control of the cognizant 9 1 1 authority”), <https://www.fcc.gov/files/csric7reportsecurityrisk-bestpracticesmitigation-legacytransitionalng911.pdf>.

<sup>24</sup> *Notice of Inquiry*, 33 FCC Rcd at 3240, para. 4. In a legacy E911 environment, carriers route wireless calls using the pre-registered location of the tower and radio antennas through which the 911 call was placed. *Id.* at 3251, para. 32. In a fully implemented NG911 environment, carriers deliver device location derived from a Location Information Server to the Emergency Services Internet Protocol Network (ESInet), and the 911 authority determines how to route a 911 call to the appropriate PSAP. *Id.* at 3251, para. 32.

<sup>25</sup> See, e.g., CTIA Comments at 6-7 (arguing that “the Commission should weigh whether the better course is to devote resources to a standalone location-based solution falling solely on the originating service provider or instead  
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routing incentivized the transition to NG911? Or, has the transition to NG911 incentivized wireless carriers to transition to location-based routing? Does the availability, speed, accuracy, or reliability of location-based routing capabilities improve as PSAPs transition from legacy 911 to NG911 operations? If so, how? Has the implementation of ESInets or other NG911 elements resulted in the number of cell sector-based misroutes increasing, decreasing, or staying constant? Do new routing issues arise with the implementation of ESInets or other steps in the transition to NG911? If so, how can the Commission help to address these issues? How can the Commission help to ensure that the delivery of location information to NG911 is consistent with NG911 systems and architecture? What steps can the Commission take to help ensure that carriers deliver adequate location information so that 911 calls can be appropriately routed? In areas that have not yet implemented full NG911 functionality, what are the potential costs and benefits of implementing location-based routing? What burdens, if any, are placed on the PSAP if a carrier implements location-based routing in a jurisdiction that has not yet implemented full NG911 functionality?

In the *Notice of Inquiry*, the Commission sought comment on the *CSRIC V LBR Report* finding that while NG911 services are designed to receive a registered or provisioned civic address or a device-based hybrid location in time to route the call to the jurisdictionally appropriate PSAP, these features are dependent on the IP-to-IP interconnection between wireless carriers and NG911 ingress components, which at the time of CSRIC's report had not yet been implemented by wireless carriers.<sup>26</sup> We seek comment on whether and to what extent carriers have made progress implementing IP-to-IP interconnection. If no or little progress has been made, what obstacles do wireless carriers face? What steps, if any, can the Commission take to mitigate these barriers?

*Current State of Location-Based Routing Technologies.* We invite commenters to update the record on the current state of location-based routing technologies, including the five technologies identified by CSRIC V, and the extent to which such technologies would be capable of supporting location-based routing today within the time constraints defined by CSRIC V.<sup>27</sup> According to CSRIC V, the location must be calculated in five seconds or less with a fairly high degree of accuracy for location-based routing to be effective in delivering the 911 call to the jurisdictionally appropriate PSAP.<sup>28</sup> In 2016, the *CSRIC V LBR Report* found promise in routing solutions that use DBH location.<sup>29</sup> Some commenters cautiously agreed that DBH location technology could be used to route wireless 911 calls.<sup>30</sup>

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to advance and incentivize NG911"); T-Mobile Comments at 7 ("[d]iverting resources to redesign routing for legacy operations could ultimately slow the transition to NG911"); NENA Reply Comments at 2-3 (asserting that "concerns that pursuing LBR improvements to E9-1-1 will slow the transition to NG9-1-1 are overstated" and arguing that the Commission should not wait for NG911 to fix problems with call routing); Texas 9-1-1 Entities Reply Comments at 3 (arguing that both "E9-1-1 and NG9-1-1 need attention in the current environment, as E9-1-1 and NG9-1-1 are not currently mutually exclusive and may not become so for a very long time").

<sup>26</sup> *Notice of Inquiry*, 33 FCC Rcd at 3251, para. 33; *CSRIC V LBR Report* at 25.

<sup>27</sup> *CSRIC V LBR Report* at 9.

<sup>28</sup> *CSRIC V LBR Report* at 9. CSRIC V noted that the voice portion of the wireless 911 call is routed by the Mobile Switching Center (MSC) no later than six seconds from when the caller presses "send." Therefore, to route on location, that location must be available to the MSC in five seconds or less. *CSRIC V LBR Report* at 8.

<sup>29</sup> *CSRIC V LBR Report* at 16-20.

<sup>30</sup> See, e.g., NENA Comments at 4-5 (noting that current trends "gravitate toward warm-start GPS processes" but that the "proprietary nature of these location services, the unknown nature of the databases that underpin them, and their management and maintenance causes questions about how well those services can be safely applied"); AT&T Services, Inc. Reply Comments at 11-12 (noting that while promising, device-based hybrid location methods have limitations, such as where handsets are restricted by poor or no access to GPS and Wi-Fi).



For DBH location technology and other location-based routing technologies, what is the current latency for providing an accurate location? Commenters generally agreed with CSRIC V's finding that delaying call routing on the timeframes for a Phase II location fix is not recommended.<sup>31</sup> How quickly can 911 calls be routed using DBH location technology in cold-start and warm-start scenarios?<sup>32</sup> Can location-based routing technologies still result in a misroute? If so, how often do such misroutes occur with location-based routing technologies? Should the Commission require carriers to provide information about the certainty of a route that uses location-based routing technology to PSAPs?

We also seek comment on the availability of location-based routing technologies for wireless subscribers, and scenarios in which location-based routing is not feasible. How widely available are DBH solutions on handsets on carriers' networks? What percentage of handsets on carriers' networks are capable of supporting location-based routing? For what kinds of users, and in what scenarios, would location-based routing not be a feasible routing method? For example, would location-based routing be feasible on devices such as non-service-initialized phones or for subscribers who choose not to or cannot use Wi-Fi or GPS?

*Location-Based Routing for Text-to-911.* In 2014, the Commission adopted text-to-911 rules requiring carriers to route texts to 911 using coarse location (cell ID and cell sector) or other equivalent means (commercial location-based services or through the device's location application programming interface) that allow the covered text provider to route the text to the appropriate PSAP.<sup>33</sup> We seek comment on the feasibility of implementing location-based routing for text-to-911. Is location-based routing a viable means of routing 911 text messages to the appropriate PSAP? Would changes to network, SMS servers, and handsets be required? If so, what changes? Would it require development of new standards? What percentage of devices on wireless networks could support location-based routing for text-to-911? Do wireless carriers have plans to implement location-based routing for text-to-911 on their networks?

*Other Considerations for Location-Based Routing.* We seek comment on any security, reliability, and privacy considerations related to location-based routing approaches. Does location-based routing raise any security or privacy concerns not previously addressed by the Commission in other proceedings? How can the Commission support the reliability of location-based routing?

*Means Available to the Commission to Improve 911 Routing.* We seek comment on steps the Commission could take to advance the implementation of location-based routing. Are there any incentives that we could create to encourage the development and implementation of location-based routing for wireless 911 calls? Are there regulatory steps we should take to advance the implementation of location-based routing and, if so, what are they? Moreover, what would be the costs and benefits associated with those suggested regulatory changes? Are there existing regulatory impediments to the

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<sup>31</sup> *CSRIC V LBR Report* at 27. See, e.g., West Safety Services, Inc. Comments at 17-18; AT&T Reply Comments at 2; NENA Comments at 3. But see Boulder Regional Emergency Telephone Service Authority (BRETSA) Reply Comments at 3.

<sup>32</sup> As the Commission previously noted, "[i]n a cold start, the RMS network and mobile device have either no GPA-related data or expired GPS-related data from a previous attempt to determine the device's location" whereas "[i]n a warm start[,] the network and mobile device do have access to some initial GPS data from a previous attempt to locate the device." *Notice of Inquiry*, 33 FCC Rcd at 3249, para. 25.

<sup>33</sup> *Facilitating the Deployment of Text-To-911 and Other Next Generation 911 Applications*, PS Docket Nos. 11-153 and 10-255, Second Report and Order and Third Further Notice of Proposed Rulemaking, 29 FCC Rcd 9846, 9874, para. 59 (2014).

development and implementation of location-based routing? If so, what steps could we take to remove those impediments?

We also seek comment on the means available to the Commission to mitigate the problem of misroutes arising from cell sector-based routing. Some commenters on the *Notice of Inquiry* argued that the Commission could take targeted or transitional action to address misroute-prone areas.<sup>34</sup> Are there any incentives we could create to encourage parties to identify and address areas with high numbers of misroutes? Should we ask carriers to identify the cell sectors where misroutes tend to occur? Should the Commission ask PSAPs to report on the number of misroutes that occur? Are there targeted solutions unrelated to location-based routing that we can pursue in areas identified with high numbers of misroutes? What specific best practices for PSAPs and carriers can the Commission encourage to minimize misroutes when cell sector-based routing is used?

*Digital Equity and Inclusion.* Finally, as part of the Commission's continuing effort to advance digital equity for all,<sup>35</sup> including people of color, persons with disabilities, persons who live in rural or Tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, we invite comment on any equity-related considerations<sup>36</sup> and benefits (if any) that may be associated with the issues discussed in this Public Notice. Specifically, we seek comment on how this inquiry into improving wireless location-based routing may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well the scope of the Commission's relevant legal authority.

*Filing Comments and Replies.* All filings responsive to this Public Notice must reference PS Docket No. 18-64. Interested parties may file comments and reply comments on or before the dates indicated on the first page of this document.<sup>37</sup> Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

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<sup>34</sup> See, e.g., NENA Reply Comments at 3 (arguing that "problem areas for routing could be prioritized in the deployment of LBR, while areas that see very few 'mroutes' can remain served by legacy cell sector routing techniques"); CTIA Reply Comments at 2 (asking the Commission to encourage targeted action, such as "additional coordination among PSAPs and by PSAPs with wireless providers"); BRETSA Comments at 10-11 (arguing that there are several measures which could be taken to mitigate Phase I misroutes, including modifying routing for sites prone to misroutes, sectorizing cell sites to limit coverage of multiple jurisdictions by a single antenna, and reorientation of cell sectors).

<sup>35</sup> Section 1 of the Communications Act of 1934 as amended provides that the Commission "regulat[es] interstate and foreign commerce in communication by wire and radio so as to make [such service] available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex." 47 U.S.C. § 151.

<sup>36</sup> The term "equity" is used here consistent with Executive Order 13985 as the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. See Exec. Order No. 13985, 86 Fed. Reg. 7009, Executive Order on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (January 20, 2021).

<sup>37</sup> Interested parties may file comments on or before July 11, 2022 and reply comments on or before July 25, 2022. See 47 CFR § 1.4(j) (filing dates that would otherwise fall on a holiday shall be filed on the next business day).



- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <https://www.fcc.gov/ecfs/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing.
- Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street, NE, Washington, DC 20554.
- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. *See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy*, Public Notice, 35 FCC Rcd 2788 (OMD 2020).

*People with Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

*Ex Parte Rules.* This proceeding shall continue to be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.<sup>38</sup> Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Rule 1.1206(b). In proceedings governed by Rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

*Availability of Documents.* Comments, reply comments, and *ex parte* submissions will be publicly available online via ECFS. Documents will be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

*Additional Information.* For further information, please contact Rachel Wehr, Attorney-Advisor, Policy and Licensing Division, Public Safety and Homeland Security Bureau at (202) 418-1138 or [Rachel.Wehr@fcc.gov](mailto:Rachel.Wehr@fcc.gov).

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<sup>38</sup> 47 CFR §§ 1.1200 *et seq.*

**STATEMENT OF  
CHAIRWOMAN JESSICA ROSENWORCEL**

Re: *Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64, Public Notice  
(June 8, 2022)

As the old saying goes, you may only call 911 once in your life, but it will be the most important call you ever make. That is one call you want to go through.

I know. Because I have watched our nation's 911 operators in action in dozens of call centers all across the country. In each and every one I saw operators take calls with steely calm and then assure the caller that help is on the way. But what I saw in the 911 center in Little Rock stays with me. The center was small but active. The desks were humming as the calls came in. The pride the public safety officials had for their work was palpable.

But what struck me most when I visited is that I learned that in the city of Little Rock if you call 911 using your wireless phone in the corner of the 911 center your call would not get routed to Little Rock. Instead, it would be answered by a 911 center in North Little Rock—which is all the way on the other side of the Arkansas River. That's because your call would be routed based on the location of the closest cell tower that receives your call—not based on your actual location.

That's a problem. Because when you make a 911 call, seconds matter. 911 calls that are routed to the wrong call center need to be rerouted to the right one. That takes time you may not have.

Here's the good news. Back in 2018 the Commission started an inquiry to explore the possibilities of Location-Based Routing to fix this problem and speed up 911 responses. Since then, some of our largest nationwide carriers have started using this technology in parts of their networks. That's good. But for most of the country today, the closest cell tower with the strongest signal will still route the 911 call, and that doesn't guarantee it will go to right call center that can send help.

So today we are jump starting our efforts to support location-based 911 routing. With this Public Notice we seek to build an updated record on carrier experiences, the state of this technology, and the steps the agency could take to improve 911 call routing.

But when it comes to 911, I don't think we should stop with improved call routing. That's because across the board we need to bring our 911 emergency communications systems into the future. There are more than 6,000 911 centers across the country and many of them are using legacy technology built for an era when calls in crisis came strictly from landline phones. It is time to make the switch to next-generation 911 systems.

Next-generation 911 means better support for voice, text, data, and video communications. It means more redundancy to protect against outages. For those who call 911, it will mean the opportunity to offer real-time video of the emergency. It will mean the ability to provide first responders with instantaneous pictures. It will mean the ability to transmit a patient's medical records right to 911 dispatchers. For those who take calls in an emergency, all of this data can expedite and inform public safety efforts, and dramatically improve emergency response.

Here's the challenge. These kinds of 911 investments don't come cheap. And for the thousands of communities across the country that have to do these upgrades, it's not clear where the support to make them will come from. That's why I've suggested we should put our public airwaves to broader public purpose in support of next-generation 911.

The FCC's authority to auction spectrum is scheduled to expire at the end of this fiscal year. That's September 30, 2022. At some point, we can expect legislation to extend it—so the agency can continue to offer airwaves for new commercial uses. We should work with Congress and public safety officials to use the billions of dollars that FCC spectrum auctions raise to build the public infrastructure this country needs, starting with using future auction revenues to fund the nation's transition to next-generation 911.

I think this is a golden opportunity. It would benefit public safety nationwide—and every one of us who dials 911 when the unthinkable occurs. In short, we can have an updated public emergency calling system that is built for the digital age, and we can use public airwaves to do it.

That's big and bold. But it doesn't take away from the effort at hand. Because improving call routing will improve safety. In fact, I know it will in Little Rock and so many other communities nationwide.

I would like to thank the staff that worked on this effort, including Brenda Boykin, John Evanoff, David Furth, Rasoul Safavian, and Rachel Wehr from the Public Safety and Homeland Security Bureau; Douglas Klein and Anjali Singh from the Office of General Counsel; and Pat Brogan, Michelle Schaefer, Deena Shetler, and Aleks Yankelevich from the Office of Economics and Analytics.

**STATEMENT OF  
COMMISSIONER GEOFFREY STARKS**

Re: *Federal Communications Commission Seeks to Refresh the Record on Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64.

Quite simply, the information gathered about location-based routing of wireless 911 calls from the item before us today will save lives. Going back to 2018, when we adopted the *Notice of Inquiry*,<sup>1</sup> we have known that legacy routing technologies, including tower-based routing, can cause 911 calls to be misrouted. In that *Notice of Inquiry*, we sought comment on more accurate technologies, such as location-based routing, that would mitigate the issue.

Unfortunately, four years later, the problem remains. Now I recognize that there has been some progress made in deploying more advanced technologies that allow for more accurate call routing. But, not enough – especially when we are talking about 911. By way of example, our local NBC affiliate released an investigative report last year that found that 100,000 911 calls each year in the Washington, DC region alone were misrouted and required a transfer.<sup>2</sup> That is hundreds of calls per day that aren't reaching the correct 911 call center. We must do better.

So, I am glad that we are going to refresh the record to determine how close we are to full deployment of location-based routing. I'm very anxious to review the record, especially to see what we can do to facilitate additional deployment. Because, this can't wait. Americans expect their call to 911 to reach the correct 911 operator. Rightfully so.

Additionally, this Public Notice is important for reasons beyond 911. A few weeks ago, I spoke at the Commission's 988 Geolocation Forum.<sup>3</sup> At the Forum, panel after panel articulated the importance of being able to geolocate a 988 call to ensure that proper resources are deployed for those facing a crisis. The same is true for other emergency numbers that people rely upon, such as the National Poison Control Hotline, or even 211. The record that develops from this Public Notice will help these emergency services as well.

I hope commenters respond to this Public Notice with a full and robust record, and I thank the Commission staff for their hard work on this item. I approve.

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<sup>1</sup> *Location-Based Routing for Wireless 911 Calls*, PS Docket No. 18-64, Notice of Inquiry, 33 FCC Red 3238 (2018).

<sup>2</sup> Jodie Fleischer, Katie Leslie, Steve Jones, Jeff Piper, *Nearly 100,000 Local 911 Calls Each Year Sent to Wrong 911 Center, Require Transfer*, NBC4 Washington (Apr. 21, 2021), <https://www.nbcwashington.com/investigations/nearly-100000-local-911-calls-each-year-sent-to-wrong-911-center-require-transfer/2646442/>.

<sup>3</sup> *Forum on Geolocation for 988*, FCC (May 24, 2022), <https://www.fcc.gov/news-events/events/2022/05/forum-geolocation-988>.