

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Wireless E911 Location Accuracy Requirements)	PS Docket No. 07-114
)	
Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems)	CC Docket No. 94-102
)	
Association of Public-Safety Communications Officials-International, Inc. Request for Declaratory Ruling)	
)	WC Docket No. 05-196
911 Requirements for IP-Enabled Service Providers)	
)	

Comments of Motorola, Inc. and Nokia Inc.

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Motorola, Inc. (“Motorola”) and Nokia Inc. (“Nokia”) (or “Commenters”) provide these comments in response to Part III A of the *Notice of Proposed Rulemaking* in the above captioned dockets concerning changes to the Commission’s requirements for enhanced 911 (“E911”) location accuracy requirements (“*Notice*”).¹ Motorola and Nokia applaud the Commission for its continuing commitment to ensuring that wireless E911 meets the needs of the American public. The Commenters have a long history of participation in the Commission’s efforts to provide location capabilities to wireless devices and support efforts to study and enhance these processes.

¹ *Wireless E911 Location Accuracy Requirements, Revision of the Commission’s Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, Association of Public-Safety Communications Officials-International, Inc. Request for Declaratory Ruling, 911 Requirements for IP-Enabled Service Providers, Notice of Proposed Rulemaking*, 22 FCC Rcd 10609 (2007) (“*Notice*”).

The Commission's expressed desire to require accuracy measurement at a Public Safety Answering Point ("PSAP") level presents significant challenges for all stakeholders. Implementation of PSAP-level testing would mark a substantial departure from the industry's understanding of the Commission's requirements and flexibility formerly accorded for the design and testing of commercially viable networks. As a result, implementation would entail a massive effort for PSAPs as well as for carriers. Thus, should the Commission adopt its tentative conclusion to require PSAP level location accuracy measurement, this change would require considerable care and necessarily require extensive time for compliance.

I. INTRODUCTION AND SUMMARY.

The Commission has long recognized the importance of location information for wireless calls to 911. The Commission first sought comment on wireless E911 requirements in 1994² and adopted its initial rules governing E911 location in 1996.³ Finally, in 1999, the Commission promulgated location requirements that are in general practice today.⁴ These rules are codified in Section 20.18(h) of the Commission's rules and require Phase II location accuracy as follows:

- (1) for network-based technologies: 100 meters for 67 percent of calls, 300 meters for 95 percent of calls;

² *Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Notice of Proposed Rulemaking, 9 FCC Rcd 6170 (1994).

³ *Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, First Report and Order, 11 FCC Rcd 18676 (1996).

⁴ *Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Third Report and Order, 14 FCC Rcd 17388 (1999) ("*Third Report and Order*").

(2) for handset-based technologies: 50 meters for 67 percent of calls, 150 meters for 95 percent of calls;

(3) for the remaining 5 percent of calls, location attempts must be made and a location estimate must be provided to the appropriate PSAP.⁵

In implementing these requirements, the Commission did not mandate specific area requirements for location accuracy measurement.

The *Notice* tentatively concludes that Section 20.18(h) should be clarified to require carriers to meet Phase II accuracy requirements at the PSAP service area level.⁶ The Commission notes that its core goal for its E911 rules is to provide meaningful automatic location information that permits first responders to render aid.⁷ In addition, the Commission sought comment on whether it should defer enforcement of Section 20.18(h) if redefined to require accuracy measurement at the PSAP service area level.⁸

Motorola and Nokia have actively participated in the process that has led to current wireless location accuracy requirements⁹ and agree with the Commission's goal

⁵ 47 C.F.R. § 20.18(h).

⁶ *Notice* at ¶ 5.

⁷ *Id.* at ¶ 6.

⁸ *Id.*

⁹ *See, e.g.*, Motorola and Nokia *Ex Parte* Comments, CC Docket No. 94-102 (filed Aug. 23, 2001); Motorola and Nokia *Ex Parte* Comments, CC Docket No. 94-102 (filed Aug. 10, 2001); Petition for Reconsideration of Nokia Inc. and Motorola, Inc., CC Docket No. 94-102 (filed Dec. 6, 1999); Letter from Mary E. Brooner and Steve B. Sharkey, Motorola, to Magalie Roman Salas, FCC, CC Docket No. 94-102 (filed Aug. 26, 1999); Reply Comments of Motorola, Inc., CC Docket No. 94-102 (filed July 2, 1999); Comments of Motorola, Inc., CC Docket No. 94-102 (filed June 17, 1999); Letter from Leo R. Fitzsimon, Nokia, to Magalie Roman Salas, FCC, CC Docket No. 94-102 (filed June 14, 1999); Reply Comments of Nokia Telecommunications, Inc., CC Docket No. 94-102 (filed Oct. 25, 1996); Reply Comments of Motorola, Inc., CC Docket No. 94-102 (filed Mar. 11, 1996). In addition, both Motorola and Nokia participated in the Commission's E911 Multi-Party Meeting on July 6, 2000.

to ensure that location accuracy for 911 calls be as precise as realistically practical given current technologies. As Motorola and Nokia have consistently informed the Commission, location capabilities for wireless devices are extraordinarily difficult to establish and maintain.¹⁰ Unlike wireline E911, consumers using wireless devices use them in a mobile fashion making location measurement a significantly more challenging technical exercise. Moreover, any changes needed to increase or extend accuracy may require changes to handsets and/or network infrastructure. These changes would require careful implementation and generally would be done over a period of years, based on standardized approaches to ensure that new technology does not disrupt the functioning of the existing wireless network and existing E911 in use. The Commission should cautiously approach changes in its wireless location accuracy measurement requirements and allow all affected parties appropriate time to comply with any changes to the current measurement policies.

¹⁰ See, e.g., Comments of Motorola, CC Docket No. 94-102 (filed Jan. 5, 2001) (noting that Motorola and Nextel require additional time to provide E911 location services); Reply to Comments to Petition for Reconsideration of Nokia Inc. and Motorola, Inc., CC Docket No. 94-102 (filed March 3, 2000) (stating that the Commission's E911 Third Report and Order establishes impractical timing and volume requirements that are unsupported by any manufacturer of wireless equipment); Reply Comments of Motorola, Inc., WC Docket No. 94-102, Attachment (filed July 2, 1999) (discussing various accuracy proposals); Letter from Leo R. Fitzsimon, Nokia, to Magalie Roman Salas, FCC, CC Docket No. 94-102 (filed June 14, 1999) (providing information on the E-OTD location method and its limitations).

II. REQUIRING TESTING AT A PSAP-LEVEL WOULD ALTER MANUFACTURERS' AND SERVICE PROVIDERS' UNDERSTANDING OF THE FCC'S E911 LOCATION ACCURACY REQUIREMENTS.

The Commission permitted wireless carriers and manufacturers to establish location accuracy measurement on a technological and competitive neutrality basis.¹¹ The Commission did not specifically provide location accuracy measurement requirements to the industry, but instead deferred to the Office of Engineering and Technology (“OET”) and the Wireless Telecommunications Bureau (“WTB”) the authority to develop and publish methods that *may* be used for verifying compliance with Phase II rules.¹²

The bulletin developed by OET, OET 71, did not mandate location measurement at a PSAP service area level, nor did it mandate any particular procedures.¹³ In fact, the Bulletin clearly stated that: “*However, it is not intended to establish mandatory procedures. Other methods and procedures may be acceptable if based on sound engineering and statistical practice.*”¹⁴ Moreover, while suggesting that the coverage area of a local PSAP might be an acceptable measurement area, OET 71 also suggested that it would be appropriate to subject a wireless service provider’s entire advertised

¹¹ *Third Report and Order* at ¶ 81 (“We reaffirm, consistent with the views of the majority of commenting parties, that a policy of technological and competitive neutrality best promotes the public safety and welfare goals of this proceeding, especially in the critical area of ALI.”).

¹² *Third Report and Order* at ¶ 85 (“Accordingly, we are tasking the Office of Engineering and Technology (OET) and the Bureau to expeditiously develop and publish methods that *may* be used for verifying compliance with our rules governing Phase II.” (emphasis added)).

¹³ Guidelines for Testing and Verifying the Accuracy of Wireless E911 Location Systems, OET Bulletin 71, April 12, 2000 (“OET 71”).

¹⁴ OET 71 at 1 (emphasis in original).

coverage area within a metropolitan area or similar region to testing.¹⁵ The Association of Public-Safety Communications Officials-International, Inc. (“APCO”) has noted that “OET Bulletin No. 71 does not provide clear guidance as to whether the relevant area of measurement should be a PSAP service area, a carrier’s service area, or some other alternative.”¹⁶

In light of this previous guidance from the Commission and latitude in the current policies noted by APCO, the wireless industry has had an expectation that development of the wireless network and location measurement was permitted as each provider thought was commercially viable and reflective of a particular network operator’s regional build-out of its network. Replacing this approach with a strict PSAP service area level requirement would fundamentally alter the understanding of the wireless industry and its approach to location accuracy measurement. Thus, any change to require measurement of location accuracy at a PSAP service area level is a new requirement. New solutions would need to be developed to ensure that these requirements can be met and these solutions would require an extended technology development and implementation cycle.

III. MEASURING AND ACHIEVING ACCURACY AT A PSAP LEVEL WOULD BE EXTREMELY DIFFICULT AND COSTLY TO ACCOMPLISH.

There are two major problems with the Commission’s proposal to require PSAP-level location accuracy. First, testing accuracy at a PSAP level would result in significant operational and financial challenges for the industry as well as for PSAPs. Second,

¹⁵ OET 71 at 4.

¹⁶ APCO Request for Declaratory Ruling, CC Docket No. 94-102, filed Oct. 6, 2004, at 2.

implementing a solution that would universally generate PSAP-level accuracy would be extremely difficult to achieve.

Testing accuracy at a PSAP level will be extremely burdensome for both the wireless industry and PSAPs. There are more than 6600 PSAPs registered with the Commission,¹⁷ including many with challenging topography or that are extremely small in geographic coverage area. An active attempt by the wireless industry to measure accuracy at all these PSAPs would require extensive amounts of time and resources. Just assuming four wireless providers per market, every single week, tests of approximately 250 PSAPs would need to be completed. This level of testing would continue indefinitely under the Commission’s proposal because all PSAPs would need to be tested every two years. Setting up a particular PSAP area for testing could entail the establishment of high-accuracy reference ground truth geographic points through professional surveying, as well as determination of the number of test points needed for the testing and sample sizes needed for statistical relevance.¹⁸ Further, any testing would likely require the use of live wireless 911 calls – requiring extensive coordination with local PSAPs to set up. In total, PSAP-level testing is likely to take several days per PSAP to set up and implement, and require extensive numbers of personnel. Should each PSAP-level test require the more than 200 test points (including ten percent in-building)

¹⁷ FCC Master PSAP Registry, *at* <http://www.fcc.gov/911/enhanced/reports/MasterPSAPRegistryV2.62.xls>.

¹⁸ “Ground truth” refers to the determination of the actual location of measurement reference points.

that APCO used in its Project LOCATE testing,¹⁹ the Commenters estimate that several wireless industry personnel, per PSAP testing area, would be dedicated to such testing over a multi-day period.

The cost of replicating such testing in over 6600 PSAPs around the country is absolutely staggering, not just for the wireless industry, but certainly for all the affected PSAPs, and would recur on a continual basis. PSAP personnel would need to participate in such testing, helping in the establishment of the PSAP service area and in aiding the wireless provider in using live 911 calls for testing purposes. In order to establish reference ground truth points throughout each PSAP area, contracts with professional surveying companies would be needed to provide these fixed points. Wireless personnel, including engineers and technicians skilled in performing accuracy measurements, would need to be dedicated to the testing in each PSAP test case. The Commenters cannot opine on the numbers of PSAP staff required, but certainly PSAPs will need to be involved in the testing process, especially if live 911 calls are used.

In addition, implementing a solution that would universally generate the required accuracy at a PSAP-level would be extremely difficult to achieve. In implementing the FCC's current requirements, manufacturers and service providers relied on the best practical technology available. This technology, however, cannot necessarily meet PSAP-level accuracy. Depending on the particulars of any new accuracy requirement, wireless providers and manufacturers may be required to develop and deploy new

¹⁹ See *An Assessment of the Value of Location Data Delivered to PSAPs with Enhanced Wireless 911 Calls*, Final Report, Project LOCATE, at 14 (Apr. 2007), http://www.locatemodelcities.org/documents/LOCATE_Final_Report.pdf.

solutions that will greatly exceed the capabilities of the existing handset or network-based technologies, or even a combination of these technologies.

Changes to require PSAP-level measurement of location accuracy would be very difficult for the state-of-the-art technologies currently deployed by the wireless industry for many reasons. Among other things, APCO has included in its most recent testing regime ten percent of calls from indoor locations.²⁰ Such changes add much greater complexity to location accuracy measurement. GPS-based handset location technology, for example, is subject to tremendous attenuation when seeking to locate handsets within buildings or homes. The wide variety of PSAP topography and size, network builds, and location accuracy technology also contribute to making location measurement at a PSAP-level extremely challenging. Network-based technologies, while generally thought to perform well in urban environments where clusters of cell sites enable triangulation for location, will not completely remedy location issues when in-building calls are included as a substantial mix of calls to 911. When a caller is placing a call in-building, the call may very well only be able to reach a single picocell specially designed to enable calling within the building. In this case, neither GPS (which may not be able to provide sufficient signal strength into the building) nor a network-based solution (which relies on multiple base stations reaching a caller for triangulation of the caller's location) will be able to obtain a proper location on a caller. Thus, any changes to require PSAP-level accuracy for wireless calls may very well require significant, costly changes to location technology that will require time to develop and build out.

²⁰

Id.

In sum, there are two major problems with the Commission's proposal. First, testing at the PSAP-level would be extraordinarily difficult and expensive for PSAPs as well as for the industry. Second, PSAP-level accuracy would be hard to attain and would require significant research and development efforts on the part of the industry. Therefore, the Commission should give consideration to other methods of testing location accuracy. Working with the Commission and public safety, the wireless industry could develop alternative, standardized testing and accuracy criteria that still would maintain the ability of PSAPs to have confidence in the accuracy of 911 caller location fixes.²¹ Such a result is much more in the public interest, as it would provide accurate location data on a more timely and cost effective basis. And, for accuracy measurement at the PSAP level, the FCC should allow adequate time to develop the technologies to achieve this.

IV. THE COMMISSION SHOULD NOT PROMULGATE ANY RULES CONCERNING SERVICE AREA MEASUREMENT REQUIREMENTS UNTIL TESTING METHODOLOGY AND ANY NEW TECHNOLOGY DEVELOPMENT ARE COMPLETED.

If, despite the enormous difficulties and costs described above, the Commission should adopt its tentative conclusion to require PSAP level location accuracy, it must also delay the effective date of such a new standard. Any changes (such as testing coverage area or pass/fail criteria) would necessitate changes in the measurement methodology

²¹ Location accuracy can be accurately tested in a more limited subset of terrain and environmental types, with the results being applicable to all PSAPs in the given area. For example, location accuracy data could be taken in a broader area where the topography is approximately the same (*e.g.*, several counties or a state). Indeed, the location accuracy data taken in a PSAP located in flatlands will not exhibit a statistically significant variation from data taken in the adjacent PSAP with comparable network infrastructure. The wireless industry would work with public safety to make sure that such testing adequately covers all the network variants while doing so effectively and efficiently.

currently deployed by individual wireless carriers. With a mandated PSAP level testing area, new testing protocols would need to be developed. Industry needs time to define, standardize, develop and deploy these new protocols. Such a new methodology should be a standardized mechanism for PSAP level testing that ensures that testing is done in an efficient, effective manner to enable PSAPs and the wireless industry to obtain accurate location data. Such standardization efforts may permit location testing to be modeled and allow PSAPs comfort that a particular location technology would fully comply with accuracy requirements without requiring each and every individual PSAP to bear the expense of PSAP level testing. As indicated above, industry also needs time to develop technology that can provide PSAP level accuracy. Indeed, this approach also will ensure that the Commission has full opportunity to review the impact that any modifications to its rules made in the second part of this proceeding may have on the industry's ability to provide PSAP-level accuracy.

A delay in the effective date of these new rules would not cause degradation to the current wireless 911 location systems. There already is in place a “for-cause” mechanism for PSAPs to trigger specific compliance testing.²² That is, if a PSAP has evidence that E911 Phase II location reporting is not functioning correctly, it can request specific compliance verification by the carriers. Should a PSAP have concerns about the reliability of data from a particular wireless provider, it should be able to invoke this policy and seek information, and corrections, from the affected wireless provider.

²² Near Term Issues for Emergency/E9-1-1 Services, Final Report, Focus Group 1A, Network Reliability and Interoperability Council VII, Appendix E at 50-54.

V. CONCLUSION.

Motorola and Nokia strongly support the Commission's goal to ensure that wireless 911 location accuracy is as meaningful and accurate as practical. Motorola, Nokia and the rest of the industry have responded to the Commission's call by investing years in research and development of location accuracy. Through the combined efforts of the industry, public safety, and the Commission, this decade-long effort has been extremely successful. The United States currently has the best emergency call location system in the world. The Commenters would like to continue down this path, but, as in the past, the development of more advanced technologies will take time. Without careful planning, costs associated with attempting to measure location accuracy at the PSAP level would be enormous for both public safety and the wireless industry. The Commission should work with the public safety community and the wireless industry to establish standardized approaches for accuracy measurement and develop more advanced location accuracy technologies. Without this combined, well thought out effort, the success of the country's current E911 network will be threatened.

Respectfully submitted,

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