

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of

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

PS Docket No. 07-114

CC Docket No. 94-102

WC Docket No. 05-196

REPLY COMMENTS OF VONAGE AMERICA, INC.

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I. INTRODUCTION AND SUMMARY.

Vonage appreciates the substantial efforts the Commission has undertaken to help PSAPs obtain and use the best location information available when a user of interconnected VoIP service dials 911, and urges the Commission to recognize that different technologies may be able to derive and deliver the best location information available in different ways. The record in this proceeding charts a clear course for the Commission to follow to realize its goal.

First, for “nomadic” interconnected VoIP services using customer premises equipment that moves infrequently, any autolocation requirement must equal the accuracy of the Master Street Address Guide-validated location information that Vonage currently delivers. Public safety organizations have expressed a strong preference for

MSAG-validated addresses. NENA even disagrees with the Commission's tentative conclusion that nomadic VoIP services should employ automatic location technology that meets the same accuracy standards as CMRS, explaining this "shoots too low."¹ Consistent with public safety's preferences, any new autolocation requirement for interconnected VoIP should make it more likely—rather than less—that first responders will kick in the right door.

Second, the Commission should support existing efforts to develop network-endpoint based autolocation solutions. Such solutions offer the most promise for VoIP autolocation and for other yet-to-be-contemplated communication services, as they provide the degree of precision public safety expects and are available wherever a user can access a broadband network.

Finally, as interconnected VoIP services have continued to evolve, so too have potential autolocation capabilities. The Commission should allow ample time for these solutions to be identified, finalized, and implemented. To this end, the Commission should convene an advisory committee comprised of all stakeholders to deal specifically with the autolocation challenges unique to interconnected VoIP services.

By taking these actions, the Commission can best ensure that innovative autolocation solutions for interconnected VoIP are developed in the near term, and that, in the interim, PSAPs will continue to have access to the most accurate location information available.

¹ Comments of NENA at 11-12 (filed Aug. 20, 2007).

II. THERE IS A REMARKABLE CONSENSUS THAT THE COMMISSION’S CURRENT REGULATIONS OFFER THE BEST APPROACH FOR NOMADIC INTERCONNECTED VOIP SERVICES.

As Vonage and others explained in their comments, the Commission’s current rules result in the most accurate and reliable location information currently available for nomadic interconnected VoIP services, and an automatic location mandate for CMRS level accuracy would substantially *decrease* overall location accuracy.² The record to date overwhelmingly affirms this conclusion.

Several of the most compelling calls for the Commission to proceed cautiously when considering changes to interconnected VoIP location reporting come from Public Safety organizations. NENA flatly disagrees with the Commission’s tentative conclusion that interconnected VoIP services that are capable of being used in more than one location should employ an autolocation technology capable of meeting CMRS accuracy standards.³ As NENA explains, echoing Vonage’s comments, a CMRS-style accuracy requirement “shoots too low” for nomadic services.⁴ NENA instead reminds the Commission of its request for “clarification of the role of . . . MSAG in providing essential definition and uniformity to nomadic caller location.”⁵ APCO also prefers that interconnected VoIP services relying on wireline connections “provide validated . . .

² See Comments of Vonage America, Inc. 7-11 (filed Aug. 20, 2007)(“Vonage Comments”); Comments of the Voice on the Net Coalition in Response to Part III.B of the NPRM at 4-5 (filed Aug. 20, 2007) (“VON Coalition Comments”).

³ See NENA Comments at 11.

⁴ *Id.* at 11-12 (citing National Emergency Number Association and Voice on the Net Coalition Joint Petition for Clarification at 5 (Jul. 29, 2005)).

⁵ *Id.* (citing National Emergency Number Association and Voice on the Net Coalition Joint Petition for Clarification at 5).

MSAG information.”⁶ The Texas 911 Alliance similarly seeks “a specific and MSAG-validated ALI record of the emergency caller’s location when such can be provided.”⁷

These comments highlight the value of the Commission’s current approach, and strongly counsel against adopting an autolocation mandate that would provide public safety with less precise location information.

Not surprisingly, a substantial cross-section of industry—from wireless, wireline, and interconnected VoIP providers, to the high-technology industry, to E911 solutions integrators—agrees that a wireless-style accuracy requirement is not appropriate for nomadic interconnected VoIP services. This is in large part because, as Qwest has explained, such VoIP deployments have completely different architectures than wireless services, and these services lack overlap sufficient to impose wireless-style requirements.⁸ Similarly, TCS, which operates both mobile and VoIP positioning centers, has observed that “[m]easurement techniques optimized for outdoor position determination do not fit the primary residential or business enterprise deployment model into which most nomadic VoIP devices are found.”⁹ Instead of grafting standards developed for an entirely different type of service onto VoIP services and risking reduced

⁶ Comments of APCO in Response to Section III.B at 5 (filed Aug. 20, 2007) (“APCO Comments”). *See also* Comments of the King County E911 Program at 14 (filed July 5, 2007). There are significant practical obstacles to implementing an approach that would apply different requirements depending only on the nature of the connection used, as providers are unlikely to know whether their service is being delivered over a wireline or wireless connection at any given time.

⁷ Joint Initial Comments of the Texas 9-1-1 Alliance and the Texas Commission on State Emergency Communications at 13 (filed Aug. 20, 2007).

⁸ *See* Comments of Qwest Communications Int’l at 2-3 (filed Aug. 20, 2007) (“Qwest Comments”).

⁹ Comments of TeleCommunication Systems, Inc. at 5 (filed Aug. 20, 2007) (“TCS Comments”); *see also* Comments of AT&T, Inc. at 14 (filed Aug. 20, 2007) (observing that the *Notice* “did not explain why location accuracy standards developed for mobile *wireless* services would be appropriate for all nomadic interconnected VoIP services, many of which are provided over *wired* access links today”).

location accuracy, the Commission should maintain its current requirement that providers deliver subscriber-reported street address to public safety.

III. THE COMMISSION SHOULD NOT DISREGARD THE CONCERNS OF PUBLIC SAFETY TO ACCOMMODATE ILL-CONSIDERED PROPOSALS FOR INTERCONNECTED VOIP.

As Vonage explained in its opening comments, the issue before the Commission with respect to existing regulations governing nomadic, interconnected VoIP is not one of accuracy. An MSAG-validated street address, when correct and delivered to the appropriate PSAP, provides first responders with accuracy far greater than even the most stringent proposed accuracy increases for wireless networks.¹⁰ While some commenters suggest that autolocation information may improve on the Commission's current approach, improved location information will only be delivered if autolocation information is available and available Registered Location is incorrect (because the user has incorrectly entered or failed to update Registered Location). The first of these conditions has not been met: no commenter has offered a technically feasible, currently deployable autolocation solution that will reliably deliver autolocation information for all interconnected VoIP services or devices. Similarly, there is no quantitative data or even record of problems arising from inaccurate subscriber-provided location information. Vonage's own experience suggests that customer-reported location information is highly reliable.¹¹ The general absence of quantitative data makes a reasoned assessment of the

¹⁰ See Vonage Comments at 3-4.

¹¹ As NENA recommends, in the rare instances where a Vonage customer provides inaccurate or highly questionable address location and calls cannot be automatically routed, calls are routed to Vonage's 24x7x365 Safety Net Call Center, which is equipped to respond with APCO certified call takers. See, e.g., Interim VoIP Architecture for Enhanced 9-1-1 Services (i2) at 38, NENA 08-001 (rel. Dec. 6, 2005) ("NENA i2 Architecture"), available at http://www.nena.org/9-1-1TechStandards/Standards_PDF/NENA_08-001_V1_12-06-05.pdf (last visited Sept. 7, 2007) (explaining appropriate response to certain call failure scenarios is to "use a default routing number . . . to route the call to an agent at a 24x7 call center.") Additionally, separate from the Safety Net Call

benefits of discarding the current Registered Location approach impossible. But while the benefits of abandoning the Registered Location approach for nomadic, interconnected VoIP are speculative, the benefits of retaining the Commission's current approach are plain. The Commission should not forsake the concrete benefit of delivering Registered Location information without a clear record demonstrating that any new approach will provide location information that is at least as precise and reliable.

While no commenter in the initial round has offered a technically feasible approach that would enable interconnected VoIP providers to comply with CMRS autolocation accuracy requirements, the following proposals, in particular, are technologically infeasible, inferior to current requirements, or both.

Nsighttel- Nsighttel, a Tier III CMRS provider, would have the Commission do away with separate interconnected VoIP location requirements entirely, instead mandating landline E911 regulations for VoIP services that are "fixed landline alternative[s]," while imposing wireless E911 regulations on VoIP applications that are "intended to be portable."¹² This proposal, as Nsighttel admits, is motivated by a desire to "level [the] competitive playing field," and, more importantly, disregards public safety's strong preference for MSAG-validated addresses.¹³

RCA- the Rural Cellular Association advocates CMRS-style regulation for all interconnected VoIP offerings.¹⁴ As noted above, however, this approach ignores the substantial benefits of the existing MSAG-validated address approach for nomadic

Center, Vonage operates a 24x7x365 Network Operations Center available to assist Public Safety Answering Points (PSAPs) with technical and operational issues.

¹² Comments of Nsighttel Wireless, LLC Section III.b at 11 (filed Aug. 20, 2007).

¹³ *Id.*

¹⁴ *See* Comments of Rural Cellular Association at 7 (filed Aug. 17, 2007)("RCA Comments").

interconnected VoIP, as well as the problems inherent in attempting to apply standards designed for mobile, outdoor use to predominantly fixed, indoor use. However, Vonage agrees with RCA that new requirements are not yet technically feasible, and cannot be implemented until a number of open issues are resolved.¹⁵

Clearwire - Clearwire correctly observes that the Commission should consider the record in this proceeding carefully and adopt feasible timeframes for compliance; however, Vonage does not share Clearwire's view that hybrid handset and network-based solutions—which Clearwire acknowledges are not yet commercially available—will be sufficiently robust to enable significant improvements in autolocation. As T-Mobile and others have explained, hybrid solutions are often unable to address location scenarios in which both components of the hybrid solution are weak.¹⁶ Moreover, such a solution is largely tailored to mobile services rather than the predominately indoor (and predominantly stationary) deployments used by the significant majority of Vonage's customers. Finally, as set forth in greater detail in Vonage's comments, there are substantial limitations to an autolocation approach based on RF triangulation for the overwhelming majority of uses contemplated by Vonage.¹⁷

Rosum –Rosum supports many of the Commission's tentative conclusions with respect to interconnected VoIP, but it has yet to demonstrate that the technologies it has advocated—including its own approach of using RF triangulation based on television signals combined with GPS—will be technologically feasible. Indeed, although Rosum has commissioned limited testing of its technology, it notes that further testing is still

¹⁵ *See Id.*

¹⁶ *See* T-Mobile USA, Inc. Comments on Section III.B of the Wireless E911 Location Accuracy NPRM at 3 (filed Aug. 20, 2007)(“T-Mobile Comments”).

¹⁷ *See* Vonage Comments at 7.

ongoing.¹⁸ While the Commission should certainly consider the potential of such technologies as more data becomes available, the limited tests performed to date do not support a conclusion of technological feasibility, particularly in light of the potential issues with this solution identified by Vonage in its opening comments, such as the infrastructure required for deployment, and the accuracy limitations (including inability to determine altitude) inherent in RF triangulation solutions.

S5 – Like Rosum, S5 offers a technology that has been neither widely deployed nor tested, in this case small chips transmitting to proprietary receivers in the 900 MHz band.¹⁹ Moreover, as other comments have noted, there are substantial risks inherent in deploying technology used by emergency services in the unlicensed ISM bands.²⁰ And as S5 has observed, it is still in the “early stages of testing,” which has yet to include a number of urban and rural deployment scenarios.²¹ S5’s proposal is simply not far enough along to demonstrate technical feasibility, and, in any event, almost certainly will be subject to the same shortcomings as other RF triangulation approaches described in detail throughout this proceeding.

YMax – Ymax suggests that it has solved VoIP autolocation simply because it plans to incorporate a cellular transceiver into its next generation VoIP device.²² But this “solution” is hardly revolutionary, and does not improve on current requirements. In addition to suffering from the limitations of current network-based CMRS autolocation

¹⁸ See Comments of Rosum Corp. at 5 (filed Aug. 14, 2007).

¹⁹ See Comments of S5 Wireless, Inc. at 2 (filed Aug. 20, 2007) (“S5 Comments”).

²⁰ See E911 Caller Location of Indoor Cellular and VoIP Devices, University of Colorado at Boulder, Interdisciplinary Telecommunications Program at 15-16, 19 (Apr. 2, 2007) (attached to Comments of AT&T Inc.).

²¹ See S5 Comments at 6.

²² See Comments of YMax Corp. at 5 (filed Aug. 20, 2007).

solutions (and YMax's solution apparently does not include the GPS capability necessary to support handset or hybrid CMRS autolocation technology), YMax evidently intends to route its emergency calls onto CMRS networks without testing, coordination, or compensation. This would be a significant step backwards for VoIP emergency calling, and does not warrant serious consideration as an alternative to current requirements.

IV. NETWORK END-POINT LOCATION SOLUTIONS HOLD THE GREATEST PROMISE FOR DEVELOPING AUTOLOCATION SOLUTIONS FOR IVS.

As Vonage and others have observed, broadband network end-point location is the most promising means of providing autolocation for nomadic, interconnected VoIP.²³ This is in large part because network end-point based solutions are, by definition, available anywhere the network is available. Verizon and others have confirmed substantial industry efforts are well underway to develop standards for interconnected VoIP location acquisition and provision of that information,²⁴ and standards bodies including NENA, NRIC, and IETF continue to work toward solutions based on precise network end points. The Commission should encourage this progress, as the record demonstrates both that CMRS-style autolocation is not a feasible alternative at this time and that, even assuming future improvements, triangulation-based approaches will always involve a degree of mathematical guesswork.²⁵

²³ See, e.g., Vonage Comments at 17-18; Comments of Andrew Corp. at 5 (filed Aug. 20, 2007) (observing that the "fundamental technology for location determination for VoIP is driven by the means of access to VoIP networks").

²⁴ See Comments of Verizon at 4 (filed Aug. 20, 2007).

²⁵ See, e.g. AT&T Comments at 13-14; T-Mobile Comments at 8-9; Verizon Comments at 1; Comments of the Information Technology Industry Council at 5-6 (filed Aug. 20, 2007); VON Coalition Comments at 5-6, 8 ; Qwest Comments at 2-3; Comments of the Wireless Communications Association International, Inc. at 9 (filed Aug. 20, 2007).

Even though network end-point based solutions enjoy a number of advantages over wireless autolocation and in all likelihood will take substantially less time to deploy than RF-based technology, Vonage reiterates its concern that end-point based solutions be given adequate time to mature to realize their full potential.²⁶ As the ATIS Emergency Services Interconnection Forum has explained, network end-point technologies are still evolving, and additional work must be done *before* autolocation standards are applied.²⁷ Such work includes “fundamental research and development, creation of standards and testing and deployment of those standards in the industry.”²⁸ Once this work is done, however, industry can reasonably be expected to move quickly to produce network end-point based solutions.²⁹ By moving towards network-based solutions for nomadic, interconnected VoIP on a reasonable timetable, the Commission can ensure the best autolocation solution for such services is developed and deployed as quickly as possible.

V. EXISTING REQUIREMENTS SHOULD BE CHANGED ONLY AFTER CAREFUL EVALUATION, AND THE COMMISSION SHOULD ALLOW SUFFICIENT TIME FOR TRANSITION.

A. A Working Group Comprising All Stakeholders Will Ensure Development Of The Best Available Autolocation Solutions For Nomadic Interconnected VoIP.

A substantial number of commenters—including wireless, wireline, and VoIP providers, E911 solutions vendors and integrators, and public safety organizations—have

²⁶ See Vonage Comments at 7.

²⁷ See Comments of the Alliance for Telecommunications Industry Solutions’ Emergency Services Interconnection Forum at 9 (filed Aug. 16, 2007).

²⁸ *Id.*

²⁹ Indeed, Andrew Corp. already has designed a Location Information Server based on the work done by NENA to date. See Andrew Corp. Comments at 6.

joined Vonage in calling for a working group to evaluate autolocation technologies.³⁰ As a number of these comments explain, a working group composed of all stakeholders, including industry, consumer, technology provider, public safety, and privacy representatives, provides the best means of identifying potential solutions and evaluating these approaches using a broad range of real-world deployment scenarios.

Because of the many issues unique to interconnected VoIP, the Commission should encourage development of a working group focused specifically on VoIP issues. In addition, the working group should specifically consider the costs and benefits of any changes to the existing rules for interconnected VoIP. In so doing, the Commission can ensure that the best means of improving location accuracy for interconnected VoIP are identified and can be implemented in the near term.

B. A Significant Transition Period Will Be Required for Any New Requirements.

Finally, regardless of which technologies ultimately become available to enable compliance with prospective new location standards for interconnected VoIP, the record is clear that such technologies are not available now, and that a significant amount of time will be required for compliance if new requirements are to be adopted.³¹ Even after technologies are developed and finalized, standards must be created and technology must be deployed. In addition, in the event that an autolocation solution requires more than a

³⁰ See, e.g., Comments of the 911 Industry Alliance Comments at 2 (filed Aug. 20, 2007); AT&T Comments at 13; Comments of CTIA – The Wireless Association at 3 (filed Aug. 20, 2007); Sprint Nextel Comments at 3 (filed Aug. 20, 2007); T-Mobile Comments at 7-8; Andrew Corp. Comments at 1-4; Comments of Intrado, Inc. at 3-5 (filed Aug. 20, 2007); Comments of Motorola, Inc. at 4-6 (filed Aug. 20, 2007); Comments of Nokia, Inc. and Nokia Siemens Networks at 1-3 (filed Aug. 20, 2007); VON Coalition Comments at 5; Comments of Texas Instruments, Inc. at 6 (filed Aug. 20, 2007); ATIS Comments at 4-5; Comments of the Telecommunications Industry Ass’n at 9 (filed Aug. 20, 2007); WCA Comments at 15-16; S5 Comments at 9.

³¹ See, e.g., VON Coalition Comments at 4; T-Mobile Comments at 3; Comments of Clearwire Corp. at 2 (filed Aug. 20, 2007); Comments of the WiMAX Forum at 3 (filed Aug. 20, 2007).

software upgrade, a substantial amount of time must also be allocated to deploy new hardware and switch out existing hardware. Indeed, if the CMRS Phase II experience is any guide, compliance involving changes to end user equipment could take a number of years. Given these constraints, the Commission should ensure that any new location requirements for interconnected VoIP are accompanied by a reasonable schedule for compliance.

C. The Commission Should Encourage Efforts to Improve PSAP Capabilities.

Public safety's comments in this proceeding highlight the importance of taking the many steps necessary to ensure that PSAPs can obtain and use the best available location information when it is delivered by interconnected VoIP providers. The Texas E911 Alliance has advocated use of databases specified in the NENA i2 architecture for future validation and routing of interconnected VoIP calls, underscoring the importance of updating state, local, and PSAP infrastructures to ensure delivery of the best information to public safety.³² NENA explains that it plans to submit "detailed information about the work of its VoIP Location Work Group,"³³ and the Commission should await this important contribution before moving ahead with new or additional requirements. NENA's promise of additional information is not surprising, as much work remains before PSAPs will be able to make widespread use of new databases or other improvements to the manner in which location information is provided. This point cannot be overstated: the record is clear that a substantial number of PSAPs (upwards of

³² See Texas E911 Alliance Comments at 14.

³³ NENA Comments at 11.

75 percent) are unable to make use of *existing* Phase II location information.³⁴ It simply makes no sense to impose an autolocation standard for nomadic interconnected VoIP that would result in less accurate location information, particularly if the PSAP is unable—or otherwise prefers not to receive—coordinate-based location information in lieu of a validated street address.

VI. CONCLUSION.

Automatic generation of location information for all interconnected VoIP services is a laudable objective. Going forward, this goal can best be accomplished by creating an environment—including an advisory committee specifically tasked with addressing autolocation solutions for interconnected VoIP—in which innovative solutions can be identified and developed, and in which sufficient time is allocated to implement those solutions fully. By doing so, the Commission can ensure that public safety has access to the best location information possible when a user of interconnected VoIP services makes an emergency call.

Respectfully submitted,



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³⁴ See VON Coalition Comments at 24.