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January 19, 2011

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Notice of Comment, Wireless E911 Location Accuracy Requirements;
E911 Requirements for IP-Enabled Service Providers, PS Docket No.
07-114; WC Docket No. 05-196

Dear Ms. Dortch:

Enclosed on behalf of TeleCommunication Systems, Inc. are comments in the above-referenced proceedings.

These comments are being filed electronically using the Commission's Electronic Comment Filing System ("ECFS") for inclusion in the record of the above-referenced proceeding.

Respectfully submitted,

STINSON MORRISON HECKER LLP

A handwritten signature in blue ink, appearing to read "H. Russell Frisby, Jr.", is written over the typed name. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

H. Russell Frisby, Jr

HF:ymt

Attachment

**Before The
Federal Communications Commission
Washington, DC 20554**

In the Matter of)
Wireless E911 Location Accuracy) PS Docket No. 07-114
Requirements)
E911 Requirements for IP-Enabled Service) WC Docket No. 05-196
Providers)

**COMMENTS OF
TELECOMMUNICATION SYSTEMS, INC.**

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**COMMENTS
OF
TELECOMMUNICATION SYSTEMS, INC.**

TeleCommunication Systems, Inc. (“TCS”) hereby submits its comments in response to the Further Notice of Proposed Rulemaking and Notice of Inquiry (“Notice”) released by the Federal Communications Commission (“Commission” or “FCC”) in the above-referenced proceeding.¹ The Commission seeks comments on “. . . how to further improve the location capability of 911 and E911 services for existing and new voice communications technologies, including new broadband technologies associated with deployment of Next Generation 911 (NG9-1-1) networks” and “. . . the ongoing evolution in the use of wireless devices and the development of location technologies.”².

TCS has already provided comments regarding the Commission’s location accuracy standards, in particular how to measure and maintain those standards, and incorporates by reference its previous comments in this docket.³ The Commission has also received timely comments regarding the positive benefits derived from competition in the provision of E9-1-1 services.⁴ In its response, TCS would like to address a series of Commission questions related to the following topics: 1) requiring interconnected VoIP service providers to automatically identify the geographic location of a customer without the customer’s active cooperation; 2) E9-1-1 obligations, if any, appropriate for VoIP services that are not fully interconnected to the public

¹Further Notice of Proposed Rulemaking and Notice of Inquiry, *In the Matter of Wireless E911 Location Accuracy Requirements* PS Docket No. 07-114, and *E911 Requirements for IP-Enabled Service Providers*, WC Docket No. 05-196, (Jointly released September 23, 2010) (“Notice”)

² *Id.* at ¶¶ 1-2

³ *Public Notice in Wireless E911 Location Accuracy Requirements*, PS Docket No. 07-114, (Released September 22, 2008) Initial Comments of TeleCommunication Systems, Inc (Filed October 6, 2008), and *Public Safety and Homeland Security Bureau Seeks to Refresh the Record Regarding Service Rules for Wireless Enhanced 911 Phase II Location Accuracy and Reliability*, PS Docket No. 07-114, (Released November 6, 2009), Refresh Comments of TeleCommunication Systems, Inc. (filed November 20, 2009).

⁴ *Comment Sought On Competitive Provision of 911 Service Presented By Consolidated Arbitration Proceedings*, consolidated proceedings WC Docket No. 08-33 and 08-185 (rel. June 4, 2009).

switched telephone network (PSTN); 3) the impact of NG9-1-1 developments on location accuracy and automatic location identification (ALI); and (4) the applicability of 9-1-1 and E9-1-1 requirements to additional wireless communications services, devices, and applications.

TCS's experience and expertise in E9-1-1, particularly as to location information, dates from the earliest days of the wireless industry. Since deploying the first U.S. wireless E9-1-1 solution in 1996, TCS has been leading the public safety solutions for wireless E9-1-1, NG9-1-1, and E1-1-2.⁵ TCS is also pioneering and improving the methods by which U.S. public safety answering points (PSAPs) can receive a wireless or VoIP subscriber's location during calls for emergency assistance.⁶ Today, TCS supports approximately 50% of all U.S. wireless E9-1-1 calls. Its industry award-winning wireless and VoIP E9-1-1 products, together with wireline E9-1-1 solutions, serve over 140 million wireless and IP-enabled devices. With the nation's only non-carrier TL 9000-certified wireless and VoIP E9-1-1 Network Operations Center, TCS highly-reliable E9-1-1 solutions ensure that a subscriber's emergency call routes to the appropriate PSAP and automatically pinpoints the caller's location information.

The importance and timeliness of this inquiry is underlined by the substantial work that has already been done by the National Emergency Number Association (NENA) in this area and related topics.⁷ NENA's consensus-building efforts have resulted in flexible yet standardized paths for many of the goals of the Notice, and no doubt many of the commenters to this docket will have been material participants in NENA's efforts. The Commission is encouraged to make

⁵ "1-1-2" is the universal emergency number used in the European Union.

⁶ It should be noted that, using current processes and technologies, VoIP subscribers' locations are derived from information voluntarily provided by the subscribers.

⁷ <http://www.nena.org/technical-standards> This observation in no way diminishes the valuable contributions of APCO, vendors, PSAPs, CTIA, wireless carriers, and others in developing standards. It is for brevity and efficiency that we focus on NENA's efforts.

full use of these resources and avoid one-off vendor-specific or short term strategies⁸, and to incorporate relevant recommendations from the Communications Security, Reliability, and Interoperability Council (CSRIC)⁹. TCS notes that CSRIC has two working groups with specific relevant deliverables (both NG9-1-1 services and location accuracy for wireless services¹⁰), and the broad industry representation involved in the CSRIC process yields actionable recommendations.

It is important to recall that the Commission's revised wireless accuracy standards have yet to be implemented by the industry; therefore, conclusions regarding their impact on existing services and implementation of the standards to newer technologies remain a largely theoretical exercise. However, in a spirit of industry cooperation and recognizing that further industry collaboration is called for, TCS offers the following general comments in response to specific questions (*paraphrased below*) posed by the Commission.

A) What is the impact of NG9-1-1 deployment on 9-1-1 and E9-1-1 location accuracy requirements?

In the Notice, the Commission seeks input on the impact of NG9-1-1 deployments on location accuracy and ALI in general and more specifically whether it should revise its location and ALI requirements to account for the deployment of NG9-1-1 systems.¹¹ In TCS's opinion, no such action is required at this time. There are some collateral impacts on location accuracy

⁸ The Alliance for Telecommunications Industry Solutions (ATIS) has produced a version of NG9-1-1 interface specifications; however, it tends to be drafted primarily from a "vendor" point of view with limited input from a broad range of public safety agencies. While these efforts have informative value, TCS encourages the Commission to pay more attention to the NENA i2 and i3 technical specifications which are the result of a true collaborative industry effort at standardization and interoperability. NENA i3 represents a one-step transition to NG9-1-1 without unnecessary interim transitions.

⁹ <http://www.fcc.gov/pshs/advisory/csrlic/>

¹⁰ CSRIC Working Group 4B – Transition to NG9-1-1, and CSRIC Group 4C - Technical Options for E911 Location Accuracy

¹¹ Notice at p. 14.

from increased wireless network density (ex., more towers) or the use of femtocells (ex., smaller service area so greater accuracy); however, E9-1-1 location accuracy can and should be managed as a distinct objective with unique technical processes, constraints, and costs.

B) Should the Commission require interconnected VoIP service providers to automatically identify the geographic location of a customer without the customer's active cooperation?

Before any final conclusions can be drawn, it will be first necessary to clarify what is meant by the term "geographic location." Latitude / longitude and civic address are both "locations," and, as noted above, the receiving PSAP would need to be able to accommodate the format provided for an automated system to be useful. That being the case, measured locations are currently only viable for radio / GPS connected devices. Otherwise, location must be manually inputted by the customer well in advance of the emergency call. VoIP Service Providers (VSPs) usually have no physical connection to the subscriber adding to the challenge of address validation. The automatic determination of VoIP subscriber location has been partially addressed by NENA in its Interim VoIP Architecture (i2) document.¹² The dramatic growth of interconnected VoIP services, as the Commission's own data shows, has created a market segment too large to remain exempt from E9-1-1 location accuracy.¹³ The industry, including broadband access providers, should reconvene to address potential technical solutions for providing automatic location information for VoIP subscribers (including wireless VoIP callers), with the goal of recommending a standard.

¹² <http://www.nena.org/standards/technical/voip/interim-voip-architecture-i2>

¹³ "Interconnected VoIP subscriptions increased by 22% during 2009 (from 21 million to 26 million subscriptions) and switched access lines decreased by 10% (from 141 million to 127 million lines) for a combined annual decrease of 6% (from 162 million to 153 million total wireline retail local telephone service connections)", *Third Local Telephone Competition Report* (Released January 11, 2011), <http://www.fcc.gov/wcb/iatd/stats.html>

C) Should the Commission use OET Bulletin No. 71 as the basis, which provides guidelines for testing and verifying the accuracy of wireless E911 location systems to verify compliance and if so, should use of OET Bulletin No. 71 be mandatory?

OET Bulletin No. 71 should be updated to reflect the Commission's most recent accuracy decision before analysis and input on this question.

D) How can location information include an accurate Z-axis component?

In the Notice the Commission indicates that it believes that a third dimension of location information could greatly enhance accuracy.¹⁴ While intuitively compelling, the inclusion of a useful altitude component for wireless location accuracy is not available in current network topologies and location measurements. Also, not only are there very significant technological issues with determining the Z-axis, there are numerous practical difficulties in interpretation.

For example, a theoretical network-based determination of calling device elevation requires either concise network antenna arrangements (including minimum elevation for each antenna when zoning laws often require lower antennas to reduce their visibility), or GPS technology (which presents difficulties for indoor calls). Next, would the report be an actual estimated coordinate, or the floor number of a civic address? If an actual height, is it calculated as above mean sea level (which may be the only measurement possible for some GPS systems), an average local topographical standard, or some other reference? Civic representations for elevation (ex., 18th Floor) present additional challenges, given that there many different building configurations (ex, Mezzanine floors, no floor 13, etc.). The inclusion of Z-axis information in location accuracy is very premature and its utility remains undefined.

¹⁴ Notice at ¶ 23.

E) *What wireless devices, services and applications provide the equivalent of mobile telephony or interconnected VoIP, whether using CMRS, Wi-Fi or other combination of wireless connectivity are not yet subject to the interconnected VoIP or CMRS 911 and E911 rules?*¹⁵

Given the importance of this issue, TCS recommends that the FCC work with NENA and the industry to establish E9-1-1 location transparency for WiFi, WiMax, femtocell, and other forms of connectivity offered by regulated carriers including VoIP over mobile broadband (in particular, if it is offered via a third-party application provider not associated with the underlying carrier). The initial goal should be a lat/long location for the network device to supplement and augment location delivery from the mobile device with the ultimate goal of lat/long for the initiating emergency caller or device. It may also be preferable for non-mobile connectivity devices with a small enough footprint (ex., femtocell), to be associated with a civic address.

F) *Should 911/E911 obligations apply to VoIP services that enable users to terminate calls to the PSTN, but do not permit users to receive calls that originate on the PSTN?*

So called “one way” services should not be permitted to take advantage of the regulatory loophole in the definition of “interconnected VoIP services”. Section 9.3, Definitions, of 47 C.F.R. § 9.3¹⁶ currently states:

An interconnected Voice over Internet protocol (VoIP) service is a service that:

- (1) Enables real-time, two-way voice communications;
- (2) Requires a broadband connection from the user's location;
- (3) Requires Internet protocol-compatible customer premises equipment (CPE); and
- (4) Permits users generally to receive calls that originate on the public switched telephone network *and* to terminate calls to the public

¹⁵ *Id.* at ¶ 36.

¹⁶ http://www.access.gpo.gov/nara/cfr/waisidx_09/47cfr9_09.html

switched telephone network.¹⁷

Some VoIP services¹⁸ that otherwise fully comply with this definition are configured so as to offer only “one-way” (i.e., either in-bound or out-bound calling, but not both) voice services to the PSTN (public switched telephone network). Pursuant to good public policy and in support of the public’s safety, this product definition arbitrage is no longer a justified interpretation of Section 9.3. This loophole should be permanently closed with either Congressional action (i.e., change the “and” to “or”), or clarification from the FCC that such services are included in Section 9.3.

G) Would an industry-developed “model 911 voice app” be helpful? Could mobile voice applications be programmed to recognize a 911 attempt, and automatically engage the CMRS component of the device (if available)?

It is possible that such an innovation, while initially reasonable, might become obsolete quickly. Many industry groups have argued that a “call 9-1-1 button” is not a suitable innovation as it results in too many false alarms. This is a question best posed to NENA or related industry forums for further discussion and a recommendation to the Commission.

H) In connection with the provision of existing CMRS offerings, wireless carriers are incorporating new network devices such as femtocells, picocells, microcells, and distributed antenna systems. In what ways can these devices and technologies be used to improve location accuracy?

¹⁷ *Id.*

¹⁸ This discussion refers to VoIP services that are stand alone applications unaffiliated with the underlying broadband carrier, and not the use of incidental use of IP technology for voice transmissions by a carrier that, for other of its products, has 9-1-1 location compliance mandates.

Although this question is primarily focused on origination networks and the location on those networks of “edge devices”, one FCC-sponsored initiative that would greatly help to provide guidance in this area would be to assist carriers and the PSAP community to develop standardized map layers (ex., GIS) that are both; 1) cohesive between jurisdictional boundaries (ex., States, Counties, Cities, etc), and; 2) also include parcel polygon boundaries down to the real-estate (tax lot) level. In many rural and suburban areas, this might enable a latitude / longitude position to fit precisely within one particular address. Otherwise, reverse geocoding based on street centerline data often only results in the wrong civic address being returned for some latitude / longitude measurements. A lat/long delivered with just a 50 meter Uncertainty Factor defines an area likely to include multiple addresses, especially in densely populated urban and suburban areas.

The industry is to be complemented for voluntarily making progress in this area. Some carriers are able to deliver lats/longs and civic address to PSPAs for emergency calls transmitted via some edge devices. Until such time as accurate GIS-based map layers are developed to cover all of the U.S., an interim step is to substitute standard definitions of service area sizes for non-mobile edge devices such as femtocells and picocells. Developing a process to associate a civic address with each would be a natural next step.¹⁹ Some edge devices include GPS capability, which should be considered and presented as supplemental data. The industry may need to modify existing standards and practices to classify the delivery of both civic and coordinate data for the same call. This is a capability of Next Generation 9-1-1, but current standards may require adjustment for this type of delivery in the interim.

¹⁹ It is important that these devices maintain a defined footprint based on their respective classification. If the industry is using the civic address for public safety response purposes, the meaning of “within the footprint of a femtocell at 123 Main St” would be more useful if defined and maintained as a consistent value.

ADDITIONAL ISSUES

TCS would like to bring two additional relevant issues to the Commission's attention; provider liability, and intellectual property rights (IPR).

PROVIDER LIABILITY

The clarification and extension of liability protection embodied in the NET 9-1-1 Act²⁰ was important, welcome, and a good start. However, this statute could be considered too "voice-centric" for the advanced telematic, non-voice devices, and other broadband based services discussed in the Notice. Also, the delivery of NG9-1-1 services entails the cooperative involvement of many parties in addition to the specific carrier where the emergency call is generated and the caller. To prevent the distraction and market dislocation that lack of appropriate liability protection would cause, the Commission should re-examine the NET 9-1-1 Act accordingly, seek industry comment, and make any appropriate legislative recommendations to both protect all coordinating and/or contributing entities to the call completion chain and to insure that all forms of "emergency" calling are equally and completely indemnified.

INTELLECTUAL PROPERTY RIGHTS

It is critical that the Commission act now to ensure that ongoing IPR disputes not serve to delay the deployment of NG9-1-1 or discourage innovation in the field. Companies subject to the FCC's jurisdiction and others may own, control, or develop IPR such as patents, copyrights, trademarks, and trade secrets that are or could be directly relevant to compliance with or fulfillment of stated FCC policies, mandates, requirements or standards. As early as 1961, the FCC announced that in support of its mandates under the Communications Act, in the

²⁰ New and Emerging Technologies 911 Improvement Act of 2008, Pub. L. No. 110-283, 122 Stat. 2620 (2008) (NET 9-1-1 Act). This Act modified Section 4 of the Wireless Communications and Public Safety Act of 1999 (47 U.S.C. 615a) to include "IP-enabled voice service providers" and "other emergency communications provider's under existing state and federal liability protections codified in the U.S.C. for their involvement in 9-1-1 communications.

development of “technical standards and regulations” it is important to give “. . . consideration to the effect of patent rights . . .” upon the process.²¹ The Commission has a long history with IPRs and has previously acknowledged its responsibilities regarding IPRs, and reasonable and non-discriminatory IPR approaches; “We remain committed to the principle of reasonable and nondiscriminatory licensing of relevant patents and if a future problem is brought to our attention, we will consider it and take appropriate action.”²² In explaining its position as related to digital television (DTV), the Commission has noted, “In order for DTV to be successfully implemented, the patents on the technology would have to be licensed to other manufacturing companies on reasonable and nondiscriminatory terms. . . . We reiterate that adoption of this standard is premised on reasonable and nondiscriminatory licensing of relevant patents.”²³

Federal law supports the Commission with development of an IPR Policy. For example, the *National Technology Transfer and Advancement Act of 1995* (“NTTAA”), Public Law 104-113, directs all federal government agencies to use, wherever feasible, standards and conformity assessment solutions developed or adopted by voluntary consensus standards bodies in lieu of developing government-unique standards or regulations. The NTTAA also requires government agencies to participate in standards development processes, given that such involvement is in keeping with an agency's mission and budget priorities. The FCC has observed, “that this approach, [licenses offered on RAND terms], is likewise consistent with the terms of the National Technology Transfer and Advancement Act and Office of Management and Budget Circular A-119, 63 Fed. Reg. 8545 (February 18, 1998), Sections 4a and 6j, which recommend

²¹ *Revised Patent Procedures of the Federal Communications Commission*, Public Notice, 3 F.C.C. 2d 26 (December 1961)

²² *In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service*, Fourth Report and Order, MM Docket No. 87-268, FCC 96-493, ¶ 55 (December 27, 1996) (“*ATSC Fourth Report*”).

²³ *Id.*, at ¶ 54.

that federal agencies participate in and support the voluntary standards process and that patents essential to a standard be licensed on terms that are reasonable and non-discriminatory.”²⁴

TCS encourages the Commission, as related to this Notice, to develop an IPR Policy so that: 1) the IPRs of FCC regulated entities and third parties are protected; 2) FCC regulated entities and third parties implementing FCC directives do not have their IPR licensing rights unreasonably inhibited by regulations, standards or other FCC mandates; 3) compliance with stated FCC policies, mandates, standards and requirements is not unduly or inappropriately burdened by the potential or actual existence of IPRs; 4) no current or future IPR holder may manipulate the FCC’s statutory obligations so as to insure an unjustified IPR benefit; and 5) the relationship of IPR Policy to 28 USC 1498 (Section 1498)²⁵ is clarified.

With regard to this last point, TCS encourages the Commission to review closely the need for an enforceable IPR policy in this docket and to close the resulting patent litigation quagmire that lack of an IPR policy creates. The FCC’s mandates that arguably require the use of unique IPR to insure compliance²⁶ create an unfortunate arbitrage opportunity for litigation minded IPR holders, sometimes called “patent trolls”,²⁷ who use the FCC’s rules to greenmail compliant

²⁴ *In the Matter Of The Development of Operational, Technical and Spectrum Requirements For Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010*, Memorandum Opinion and Order on Reconsideration in, WT Docket No. 96-86, FCC 99-85, at Para. 21 (April 26, 1999).

25 [i] <http://www4.law.cornell.edu/uscode/28/1498.html> § 1498. Patent and copyright cases
(a) Whenever an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, the owner’s remedy shall be by action against the United States in the United States Court of Federal Claims for the recovery of his reasonable and entire compensation for such use and manufacture. . . . For the purposes of this section, the use or manufacture of an invention described in and covered by a patent of the United States by a contractor, a subcontractor, or any person, firm, or corporation for the Government and with the authorization or consent of the Government, shall be construed as use or manufacture for the United States.

²⁶ The danger is that entities that are required to use certain IPR in order to comply with specific FCC mandates will then find themselves subject to Patent holder infringement suits.

²⁷ http://en.wikipedia.org/wiki/Patent_troll

carriers and their vendors into licensing agreements or face crippling litigation expenses.²⁸ The direct effect of such litigation is delayed, modified, or non-compliance with FCC directives, but the chilling effect on future compliance and/or technological advancement is even more damaging to the industry and the public's safety. Money spent on baseless litigation cannot be spent on 9-1-1 innovation.

Fortunately, Section 1498 closes this arbitrage opportunity by permitting the federal government to fairly license patents when a regulated company's performance under the relevant mandate is factually determined to be "by or for" the United States. Section 1498 is fair to all parties because it: 1) preserves the IPR holder's cause of action; 2) simplifies royalty negotiations; 3) dramatically lowers costs for all parties by using only one forum for the cause of action; and 4) removes the prohibitory chilling effect of surprise litigation by limiting distracting litigation against otherwise compliant carriers and vendors. The Commission should issue definitive guidance that when a carrier or its vendor is in compliance with the Commission's mandates and regulations such action are "by or for" the benefit of the United States in compliance with Section 1498.

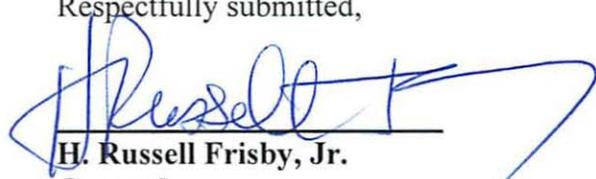
Conclusion

In summary, TCS offers its comments above regarding the Commission's questions in this Notice, and encourages the Commission to resolve the additional open questions regarding liability and IPR that this Notice raises.

²⁸ In 2007, the biennial American Intellectual Property Law Association economic survey pegged actual litigation costs for *successfully defending* a patent infringement case at up to \$4mil per case (for smaller cases). Other authors cite similar costs. Note that costs rise proportionally with the value of the patent rights at stake in the case; if the rights are more valuable, the litigation costs increase. Also, these are only the direct litigation costs and do not include significant company administrative and other costs (ex., costs of discovery, executive time, travel, etc.).

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