

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

In the Matter of)
Wireless E911 Location Accuracy Requirements) **PS Docket No. 07-114**
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)
)

**REPLY COMMENTS OF
TELECOMMUNICATION SYSTEMS, INC.
CONCERNING PROPOSED “ROADMAP”
FROM APCO/NENA/AT&T/SPRINT/T-MOBILE/VERIZON**

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**REPLY COMMENTS OF
TELECOMMUNICATION SYSTEMS, INC.**

TeleCommunication Systems, Inc. (“TCS”) hereby submits its reply comments (“Reply”) in response to the Public Notice (“Notice”) released by the Federal Communications Commission (“Commission” or “FCC”) dated November 20, 2014¹. The Notice seeks comments on the filing by APCO, NENA, AT&T, Sprint, T-Mobile, and Verizon of a voluntary consensus agreement that describes a roadmap (“Roadmap”) to addressing Indoor Location Accuracy.

TCS submits these comments in the context of the Official FCC Blog² (“Blog”), dated December 17, 2014, and comments filed regarding the Notice. The Blog addresses a number of issues raised by various parties regarding the Roadmap. Using the Blog as backdrop for some of the comments, questions, and issues raised seemed appropriate.

Reply Comments from Questions Raised in Blog

The Blog raised four questions, some having broad scope while others addressed more narrow issues, for which the FCC is seeking answer. As a supporter of the Roadmap, TCS would like to offer its perspectives regarding these questions.

¹*Public Safety and Homeland Security Bureau Seeks Comments in the E911 Location Accuracy Proceeding on the Location Accuracy “Roadmap” Submitted by APCO, NENA, and the Four National Wireless Carriers.*, PS Docket No. 07-114, (Released November 20, 2014) (“Notice”)

² See <http://www.fcc.gov/blog/closing-911-location-accuracy-gap>

Closing the 9-1-1 Capability Gap

The Blog raises the question:

- How might the recent APCO/NENA/Carrier Roadmap best help close the 911 wireless location accuracy capability gap?

TCS provided support for a number of the elements of the Roadmap, which were described in its *Ex Parte* comments (“Comments”) dated December 15, 2014.³ TCS will not repeat this support in its Reply but wishes to reinforce two perspectives addressed by the Roadmap which directly address closing the 911 wireless location accuracy capability gaps.

First, the Roadmap acknowledges that the current 9-1-1 location systems do not, and perhaps cannot, differentiate between indoor and outdoor calls. There is no indicator provided with each call that identifies an indoor or outdoor status. To date, TCS has not been able to find any statistical measures of the indoor/outdoor status of actual 9-1-1 calls. An indoor location accuracy problem is inferred from various statistics presented describing the large number of calls coming from wireless phones and the studies showing that almost 40% of US households rely on wireless phones for their primary or sole communications needs. TCS does not suggest that the existence of an indoor location accuracy problem should be debated, but the lack of statistics makes it difficult to set solid goals for improvement if we only focus on indoor calls. This is an area that the Roadmap addresses better, in TCS opinion, than the Notice. The Roadmap does not attempt to distinguish between indoor and outdoor calls and relies, instead, on looking at statistics for all 9-1-1 calls, relying upon actual 9-1-1 call data. Thus, establishing goals and metrics for all 9-1-1 calls sets a more measurable approach than the Notice which

³ See TCS *Ex Parte* Comments to the proposed Roadmap, dated December 15, 2014.

attempts to establish metrics for indoor 9-1-1 calls only. Taking the approach suggested by the Notice would make it near impossible to address real-world 9-1-1 calls and leave questions of call improvement unanswered. In this way, the Roadmap better addresses, measures, and therefore closes the indoor location accuracy capability gap.

Second, the Roadmap suggests an approach that would provide dispatchable location for many of the indoor 9-1-1 call location scenarios seen in the real world. Rather than using the approach in the Notice which relies solely on a measure of accuracy for an indoor 9-1-1 call as tested in a test bed, the Roadmap suggests using real-world calls in a test area. In addition, the technology approach suggested by the Roadmap would allow the presentation of a dispatchable location, defined as a civic address with supplemental information that could include building number, floor number and suite identification. By its very nature, a dispatchable location allows rapid first response to a caller at the provided location. Though the Notice did not preclude the use of such data, neither did the Notice give guidance regarding the treatment of dispatchable location and how such information would be used to meet a location accuracy compliance metric. The Roadmap provides specific guidance on the use of dispatchable location, recognizing that providing such information would affirmatively close the indoor location accuracy capability gap in a very definitive way. In short, if a trustworthy dispatchable location can be provided, then the toughest location accuracy metric would be met.

Beyond these two highlights of the Roadmap, there are areas not addressed by the Roadmap directly but envisioned within it. For example, some have asked about how the dispatchable location will be delivered to the PSAPs and whether a new class of service

will be required. We are already facing this question with the deployment of femtocells, systems purchased by homeowners and businesses to boost the cellular signals in their homes or facilities and which can, and sometimes do, provide a dispatchable location. This is one reason why the Roadmap presented a milestone for a pre-standards demonstration. The Roadmap attempts to address this issue, and others like it, by incorporating a live pre-standards demonstration of location fixes from Roadmap technology. This was not suggested by the Notice because only latitude, longitude and elevation were more narrowly considered.

Comparison of Notice and Roadmap Implementation

The Blog raises the question:

- Given commitments made to implement the Roadmap, what specific elements of the previous FCC proposal remain relevant and what elements are not sufficiently covered in the Roadmap?

One repeated concern appears to be a belief that the Notice provided aggressive location metrics while the Roadmap does not. TCS suggests that the two sets of metrics are incompatible with each other and cannot be easily compared. TCS further suggests that the indoor location metrics suggested in the Notice could not be met by any standards-based solution currently available on the market in the timeframes suggested. Thus, the metrics cannot be compared, and the dates suggested by the Notice likely would not be met. Based upon the CSRIC III study, no location technology met the required standards for all location morphologies tested. The Metropolitan Beacon Systems (“MBS”) technology which, in the study, came closest to meeting the stated

FCC goals will require standards work, implementation of hardware changes in various devices, the dissemination of these devices to consumers, and the distribution of a set of beacons that would need to cover a substantial portion of the United States. It seems unlikely to TCS that such activity can be accomplished in the timeframes mentioned in the Notice. This is not a criticism of the MBS technology; rather, TCS suggests that the timeframes in the Notice would not be met.

Thus, many of the organizations which have filed concerns about the Roadmap because it does not provide aggressive milestones as found in the Notice are building their arguments on a false narrative. No parties are at fault – there simply is not a fair comparison to be drawn.

In TCS' view, the Roadmap proposes an aggressive timeline, recognizing that standards work still needs to be done. One important difference, though, is that the foundation of the standards work suggested by the Roadmap would not require hardware changes to devices. Software updates could allow a faster roll-out of the solution. The Roadmap's greatest challenge lies with the collection and management of data. These, in TCS' view, are more manageable challenges; and, thus, the Roadmap, from a practical perspective, has a better chance to more rapidly close the indoor location accuracy capability gap than the Notice provides.

Using the Full FCC Record

The Blog raises the question:

- How might the Commission use the full record to close the wireless 911 indoor location capability gap effectively, affordably, expeditiously in a measurable and accountable manner?

TCS suggests that the Roadmap be accepted as a measurable approach to introduce technologies that would effectively provide locations of indoor 9-1-1 callers. The Roadmap's goals closely align with FCC intentions as expressed in the Notice and are based upon similar fundamental principles:

- The Roadmap suggests measurable metrics
- The Roadmap suggests multiple technologies, deployed in a vendor-neutral fashion
- The Roadmap suggests the creation of a test bed for demonstration of the efficacy of new technologies when applied to specific morphologies that are challenging for current location technologies

The presence of these common principles allows the FCC to apply comments in the existing record to the specified goals of the Roadmap.

There are issues presented in the FCC record that neither the Notice nor the Roadmap directly address. For example, some requests in the record address the need for accurate call routing, citing that some wireless calls are routed to the incorrect PSAP today and cause a significant delay in emergency response. Some of the technology that TCS demonstrated to the FCC and discussed in the Roadmap could provide call routing based upon a dispatchable location rather than upon cell tower information. In one

general scenario, TCS and Cisco demonstrated that the reception of an enterprise indoor location could be provided in fewer than four seconds, and this could be used in future 9-1-1 routing systems. Thus, the Roadmap provides the potential to address issues raised in the record but not specifically addressed by the Notice.

Privacy and Security Concerns

The Blog raises the question:

- How do we ensure that legitimate privacy and security concerns are appropriately addressed?

From TCS' perspective, the technologies suggested by the Roadmap raise no new privacy concerns that do not already exist with today's 9-1-1 solutions; and the security concerns raised are no greater than those already facing public safety with regards to Next Generation 9-1-1 ("NG9-1-1") technologies.

Regarding privacy concerns, the Roadmap suggests three technology approaches to provide either a dispatchable location or heightened location accuracy for all future 9-1-1 calls: A-GNSS (Assistance for Global Navigation Satellite Systems), OTDOA (Observed Time Difference of Arrival), and Wi-Fi[®]/Bluetooth[®] reference locations provided in a National Emergency Address Database ("NEAD").

GNSS and OTDOA are enhancements to existing location technologies in use today, specifically GPS (Global Positioning System) and AFLT (Advanced Forward Link Trilateration). A location fix of a caller is determined at the time of a 9-1-1 call using these technologies. There are no new privacy concerns with regards to these

technologies. Thus, TCS concludes that the privacy concerns are associated with the creation and maintenance of the NEAD.

The NEAD, as discussed in the Roadmap, would consist of the reference location of various Wi-Fi and Bluetooth devices. These reference locations would only need the following information: a unique identifier of the device, a dispatchable location associated with the device, and potentially a latitude/longitude/elevation of the device. As described, it is not clear that this information includes Personal Identification Information (“PII”) as typically defined by privacy groups. And though an argument could be made that this information could be combined with other data sets such that a specific Wi-Fi or Bluetooth device could be associated with the domicile of a particular individual and thus transform the data into PII, it is equally clear that existing 9-1-1 infrastructure contains this information. For example, the Voice over IP (“VoIP”) registration databases and the wireline Automatic Location Identification (“ALI”) databases contain information that would be similarly described as PII. Thus, our current public safety infrastructure contains much more sensitive information than what the Roadmap envisions. TCS believes it is reasonable to conclude that the Roadmap does not introduce a new problem with regards to privacy – the NEAD clearly must be protected from theft and intrusion in the same way that our existing systems must be, and have been, protected.

Regarding security concerns, it is clear that the technologies suggested by the Roadmap are similar in nature to the technologies already deployed to support VoIP and, to some extent, NG9-1-1 systems used by many public safety jurisdictions today. Our systems are interconnected using interfaces that must be protected from hacking, hi-

jacking, and other malicious intent. Thankfully, cybersecurity is an area of intense focus at the FCC, specifically in many of the CSRIC (Communications, Security, Reliability and Interoperability Council) working groups. Thus, the FCC is uniquely qualified and capable to provide guidance for these solutions. TCS has a Cybersecurity business group that specifically tests TCS-fielded solutions for our public safety offerings; and to the extent that TCS will be involved with deployment of the Roadmap, TCS expertise will be focused on these security concerns.

Some concern was raised about the security associated with using a Russian-managed satellite system, GLONASS, as part of the A-GNSS solution. It is important to note that GNSS solutions are receive-only systems. Thus, no information is transmitted to the Russian satellites. In addition, the interfaces receiving the Russian satellite transmissions are well-defined, managed by standards committees, and vetted by the global engineering community. The chipsets embedded in wireless devices which use GNSS are manufactured by numerous global entities. And should the Russian satellites fail to perform, whether by accident or malicious intent, the GNSS location calculations can rely solely on the US-managed GPS.

It is appropriate to be concerned about security. The Roadmap, TCS' view, raises no more concerns than are already outstanding.

In conclusion and despite comments providing a contrary position, TCS continues to believe that the Roadmap is the most effective and most rapid approach to solving indoor location accuracy challenges for 9-1-1. The Roadmap suggests deploying trusted,

well-tested technologies and suggests an aggressive timeframe that provides appropriate time for standards development and deployment.

Respectfully submitted,



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