

**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	)	
	)	
E911 Requirements for IP-Enabled Service Providers	)	WC Docket No. 05-196
	)	

To: The Commission

July 11, 2007

**REPLY COMMENTS OF TECHNOCOM CORPORATION**

TechnoCom Corporation ("TechnoCom") hereby replies in response to initial comments to the Commission's Notice of Proposed Rulemaking, FCC 07-108, for the above-captioned proceedings (namely, PS Docket No. 07-114 and WC Docket No. 05-196). TechnoCom fully supports the Commission's objective of improving the location accuracy of wireless E911 calls.

As stated in its initial comments, TechnoCom is a provider of automated solutions to test, monitor and report on the accuracy of wireless location solutions for E911 and commercial location based services. Its LocationAssurance Manager® (LAM)<sup>1</sup> is an automated platform for conducting wireless E911 accuracy testing and reporting based on the guidelines provided in OET Bulletin No. 71, testing methodologies established within the Emergency Services Interconnection Forum (ESIF)<sup>2</sup> and its own internally-developed best practices. TechnoCom's LocationAssurance Manager is one of several available E911

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<sup>1</sup> TechnoCom's LocationAssurance Manager product brochure, attached hereto as Appendix A, provides an overview of its capabilities and features. For further information please see <http://www.technocom-wireless.com>.

<sup>2</sup> ESIF, a committee of the Alliance of Telecommunications Industry Solutions (ATIS), is the "primary venue for the telecommunications industry and public safety and other stakeholders to generate and refine

accuracy testing solutions on the market. The various wireless networks into which TechnoCom's LAM system has been deployed represent a cross-section of essentially every commercially-deployed wireless Phase II E911 location implementation to date, including CDMA using AGPS/AFLT, GSM and TDMA using U-TDOA, GSM and TDMA using RF Signature, and iDEN™ using AGPS.

After examining the initial comments filed in this proceeding, TechnoCom takes issue with certain statements made in the joint comments of Motorola, Inc. and Nokia Inc. ("Motorola and Nokia")<sup>3</sup> regarding the availability of appropriate testing technology and the feasibility of testing and compliance reporting for varying geographic areas, in particular:

1. Motorola and Nokia assert, "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."<sup>4</sup>

TechnoCom's LAM platform, which is currently installed for commercial use in 5 wireless carrier networks that collectively serve over 70 million subscribers, provides the ability to test and report on E911 location accuracy at any geographic level, including PSAP, MSA/RSA and State. LAM is an automated testing and reporting system that uses specifically-designed handset-based probes, called LocationAssurance Devices™ (LADs), that autonomously make and record E911 test calls during normal network operation. The probes collect differential GPS ground truth<sup>5,6,7</sup> during each test call that is then automatically compared with the E911 location determined within the carrier's wireless network that would normally be sent to a PSAP. Accuracy reports may be automatically generated at any use-specified

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both technical and operational interconnection issues to ensure life-saving E9-1-1 services are available for everyone in all situations." See <http://www.atis.org/esif/index.asp>.

<sup>3</sup> See Comments of Motorola, Inc. and Nokia Inc. in the above-captioned proceedings.

<sup>4</sup> See Comments of Motorola and Nokia at page 9.

<sup>5</sup> "Ground truth" refers to on-site determination of the actual geographic coordinates of a test point typically using stand-alone continuously-tracking GPS receivers with differential correction capabilities, known as differential GPS. Ground truth may also be further refined from GPS-derived location through the use of dead reckoning (inertial navigation systems) and other augmentation methods or by a number of conventional survey techniques.

<sup>6</sup> *OET Bulletin No. 71* at page 7 suggests that the use of differential GPS, which can typically achieve accuracies of 3 to 5 meters, is an acceptable method for ground truth determination.

<sup>7</sup> ESIF Technical Report ATIS-0500001, *High Level Requirements for Accuracy Testing Methodologies*, July 23, 2004 at page 6 specifies differential GPS as an acceptable approach for ground truth determination.

geographic service area level (e.g., PSAP, MSA/RSA, and/or State). The TechnoCom LADs may be installed in vehicles for outdoor testing or at fixed locations for testing either outdoors or indoors.

Furthermore, the LAM system may also use data gathered from standard handsets conducting test calls from pre-designated outdoor or indoor locations to augment LAD-generated test data. To help further mitigate the complexities associated with indoor testing, TechnoCom fully supports recommendations developed within ESIF Subcommittee G establishing alternative cost-effective means for handling indoor test calls via benchmarked comparison to the performance of outdoor test calls.<sup>8</sup>

TechnoCom's LAM product focuses on the "system under test" identified by ESIF<sup>9</sup>, which is that part of the end-to-end emergency services network that is under the control of the wireless carrier. LAM off-loads the burden of handling test calls from PSAP operators by emulating the emergency services network elements that interface with, but fall outside of, the wireless network. Such elements external to the wireless network were appropriately deemed, through the work of ESIF Subcommittee G, to not be relevant to accuracy testing. Methods by which such elements may be validated entail less intensive test calling procedures and are consistent with well-established functionality testing methodologies such as those also standardized within ESIF Subcommittee G.<sup>10</sup>

2. Using the costs of APCO's Project LOCATE testing as a basis, Motorola and Nokia state that testing would be prohibitively expensive, "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".<sup>11</sup>

While it is fair to say that testing at more granular levels adds cost to testing when compared to employing the same test methods at less granular levels, the one-time labor-intensive testing that APCO conducted<sup>12</sup> is not indicative of larger-scale, automated testing that would be employed for any level of on-

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<sup>8</sup> Draft ESIF Technical Report ATIS-0500010, *Maintenance Testing*, published in January 2007 for final release, at page 13.

<sup>9</sup> ESIF Technical Report ATIS-0500001 at page 5.

<sup>10</sup> ESIF Technical Report, ATIS-0500009, *High Level Requirements for End-to-End Functional Testing*, April 5, 2006.

<sup>11</sup> See Comments of Motorola and Nokia at page 8.

<sup>12</sup> 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](http://www.locatemodelcities.org/documents/LOCATE_Final_Report.pdf).

going accuracy compliance testing mandated by the Commission. Large-scale testing (at any level of service area granularity) may be more cost-effectively conducted through the automated placement, analysis and reporting of the test calls, made during the normal course of network operation and without the active participation of field testing technicians and back-office support staff. Such automation, when properly applied, vastly reduces the amount of human labor involved in the process of testing and reporting, which not only reduces testing cost, but also reduces the likelihood of repeated human-induced errors, thus increasing the quality and reliability of the testing. As a result, testing at a higher level of geographic granularity does not result in anywhere near the linear extrapolation of the Project LOCATE costs alluded to by Motorola and Nokia.

For automated testing and reporting associated with more granular test areas, increased costs would result from more test probes potentially being needed to cover more areas within a given time frame, additional test system administrator personnel (which would nonetheless be far fewer in number than the number of field and back-office personnel required for manual testing and reporting), additional network usage expenses (for the added volume of test calls), and more time spent managing the larger number of resulting reports. However, TechnoCom believes that deriving a cost estimate from extrapolation of manual testing costs is improper and vastly magnifies the cost.

3. Lastly, in their filing, Motorola and Nokia indicate that a new PSAP testing methodology would need to be created, “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.”<sup>13</sup>

Subcommittee G within ESIF has developed recommendations for methods of accuracy testing<sup>14</sup>, end-to-end functionality testing<sup>15</sup>, and maintenance testing<sup>16</sup>, all motivated by the needs for technically-sound, cost-effective testing of wireless E911 location systems. These recommendations include a means for handling the difficult issue of indoor performance characterization. The accuracy testing methodologies resulting from this ESIF activity are

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<sup>13</sup> See Comments of Motorola and Nokia at page 11.

<sup>14</sup> ESIF Technical Report ATIS-0500001.

<sup>15</sup> ESIF Technical Report ATIS-0500009.

<sup>16</sup> ESIF Technical Report ATIS-0500010.

directly applicable to any service area level testing, whether it be PSAP, MSA/RSA, State, or otherwise. Throughout the development of these guidelines and recommendations, TechnoCom believes that the presence of a mandate from the Commission has catalyzed these efforts, despite the apparent competing interests of the various stakeholders, and has helped facilitate their successful resolution.

In addition to the above reply comments specific to the initial comments of Motorola and Nokia, TechnoCom recommends, based on its extensive experience with the various technologies used in E911, that the Commission consider drawing a distinction between: a) testing and reporting requirements for the purposes of enhancing the accuracy and quality of E911 service; and b) the regulatory compliance requirements for wireless E911 location accuracy. Whereas testing and reporting at the granularity of individual PSAP service areas is likely to improve the quality of response to actual emergencies, a goal supported by virtually all commenters in these proceedings; meeting an accuracy mandate at a larger geographic level, such as an MSA/RSA or BTA could very well accomplish the objectives of ensuring adequate E911 performance in the wireless networks that serve the PSAPs within that larger geographic area if detailed visibility to performance information is available to the affected PSAPs. A larger geographic area, for example an MSA/RSA or BTA, very often has an adequate mix of environments that can mitigate and average out the specific variations that could be encountered at the level of small PSAP service areas, thus mitigating the risk of non-compliance due to a localized anomaly (whether it be caused by geographic features, man-made structures, wireless network deployment, or location technology limitations). The benefits of establishing a regulatory accuracy compliance area that is distinct from a requirement for E911 accuracy testing and reporting for individual PSAPs within the larger compliance area should be considered by the Commission upon carefully weighing the various factors of cost versus improved public benefit.

## CONCLUSION

TechnoCom requests that the Commission take into consideration the views expressed above and in TechnoCom's initial comments. E911 location accuracy testing and reporting are possible and practical at any level (PSAP, MSA/RSA or State) that the Commission may deem to be in the public interest. However, drawing a distinction between testing and reporting at the PSAP level versus regulatory accuracy compliance, possibly at the level of a larger geographic area such as an MSA/RSA or BTA, is worthy of the Commission's consideration.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mario Proietti". The signature is fluid and cursive, with the first name "Mario" and last name "Proietti" clearly distinguishable.

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## Appendix A

# LocationAssurance Manager®

## Measure ▪ Report ▪ Optimize

Much like your voice or data network, achieving and maintaining a high level of location quality of service requires the right technology partner who can provide comprehensive products and services to measure, report, and optimize the performance of your location networks.

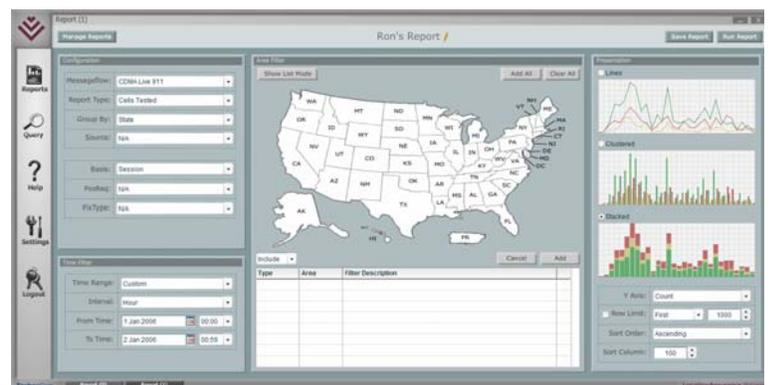
Combining TechnoCom's unparalleled field experience with our "best in class" location assurance products — **LocationAssurance Manager® (LAM)** and **LocatePredict®** — wireless network operators now have a 360-degree view of their location systems. This ensures the most cost-effective and complete view of their location network performance and service quality.

**LocationAssurance Manager®** is a service quality management and reporting platform for wireless location networks allowing carriers to achieve and maintain peak operating performance of their location infrastructure and services. LAM proactively monitors the end-to-end location system, identifies trouble spots and analyzes the true Quality of Service (QoS) experienced by the subscriber.

**LocatePredict®** is a location performance, network planning and analysis platform used to predict the performance of network-based location systems. Based on a collection of network data, it will predict if location sensors exceed, meet or fall short of the expected coverage and performance in specific test areas. LocatePredict allows GSM wireless operators to meet FCC and EC regulations and, at the same time, satisfies customer and subscriber demands.

## About TechnoCom

**TechnoCom™** is a leading-edge provider of solutions to enable wireless location services and assure their ongoing performance. We offer location network support solutions combined with related professional services to wireless operators, service providers and system integrators. Our reputation for service, performance and excellence — along with our history of on-time delivery — are the reasons customers select TechnoCom as a long-term partner.



# LocationAssurance Manager®

## The Leader in Location Service Quality Management

As the number of wireless subscribers using commercial and emergency location-based services continues to grow, operators are faced with increased demands on their location infrastructure. These demands include meeting regulatory requirements based on specifically-defined accuracy criteria while meeting the overall commercial requirements of application providers and end-users.

Are you certain that your location infrastructure is operating at peak performance?

## About LAM

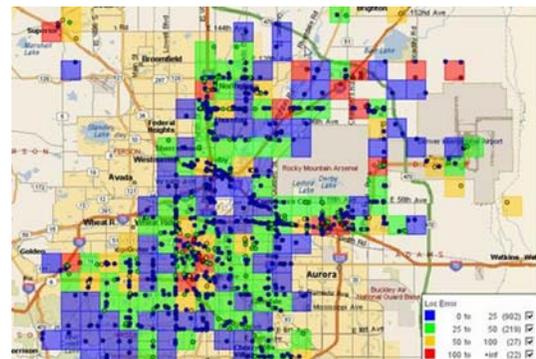
TechnoCom's LocationAssurance Manager (LAM) is the first platform of its kind enabling wireless network operators to efficiently and cost-effectively manage their emergency and commercial location infrastructures and services while providing mandated regulatory and key performance indicator reporting. LAM is a service-quality management and reporting platform for wireless location networks allowing carriers to achieve and maintain peak operating performance of their location infrastructure and services. LAM proactively monitors the end-to-end location system, identifies trouble spots and analyzes the Quality of Service (QoS) experienced by the subscriber.

Whether the location infrastructure is managed by the operator in their network or hosted through a service provider, LAM provides the tools necessary to maintain peak operating performance of a location network.

## Multiple Applications – One Solution

LAM is available with configurations that support CDMA, GSM and iDEN™ networks and supports all location network technologies. LAM delivers one flexible solution for commercial and emergency-location networks with the following applications:

- Location Quality of Service (QoS) Management
- E911 Automated FCC Compliance Reporting
- gpsOne™ Network Assisted Calibration
- RF Network Performance Measurement



# LocationAssurance Manager<sup>®</sup>

## Features

### Autonomous Field Data Collection

LAM collects in-field location accuracy data using its LocationAssurance Devices<sup>™</sup> (LADs), a combination of hardware and software that automates in-field test call processes to test, verify, calibrate and evaluate the performance of your location network. LADs can be configured for mobile, fixed or stationary operating modes and use the wireless data network for over-the-air configuration and delivery of test-event data to the LAM Network Server<sup>™</sup>.

### Performance Monitoring & Threshold Alerting

Once the LAM receives empirical data from the LADs, it is analyzed and processed to create operational measurements and trigger threshold alarms to indicate network failure or the deterioration of service quality. This allows operators to detect and respond to network issues wherever and whenever they occur in the end-to-end location system — and before they turn into subscriber service issues.

### Service Data Aggregation

The aggregated empirical test data is compiled with data collected from network element logs, such as a mobile positioning center (MPC) or positioning determination equipment (PDE), to provide greater visibility across an operator's location network. This allows the operator to detect and isolate problems and faults quickly and efficiently.

### Graphical & Tabular Ad-Hoc Analysis

LAM's reporting and business intelligence tools combined with ad-hoc data analysis capabilities allow core RF and network engineering staff the flexibility to create custom queries for ad-hoc analysis in support of fault resolution.

### KPI & Compliance Reporting

A core component of LAM's functionality is the ability to compile statistical reports for Key Performance Indicators (KPI) and compliance reporting. LAM is fully compliant with FCC OET Bulletin No. 71. Fully-formatted OET-71 reports can be quickly generated with nationwide, state or PSAP resolution.

## Benefits

### Customer Satisfaction

LAM puts your organization at the forefront of customer service while improving your bottom line. How? LAM delivers real-time information to facilitate effective decision-making, define and publish key performance metrics and establish service-level agreement with customers.

### End-to-End Visibility

LAM's visibility across the network makes it possible to reduce trouble-shooting guesswork and instantly pinpoint problem areas using in-field test units. With LAM you can generate test calls throughout the network and centralize transaction logs from all elements in the location-service delivery chain to maintain and achieve optimal network performance.

### Operational Efficiency

LAM's autonomous ability to automate the collection and processing of field data increases operational efficiency and raises overall Quality of Service. Near real-time performance validation frees-up engineering resources to focus on identifying emerging problems, preventing costly outages and service degradations and increasing performance optimization.

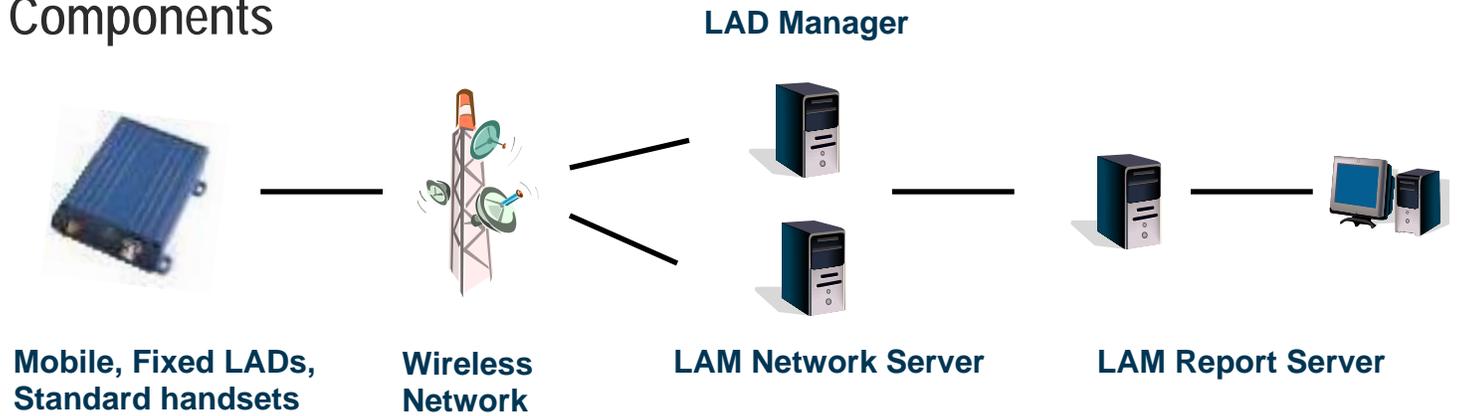
### User Experience

LAM enables a wireless operator to manage the location network with the same eye for performance that is used when managing voice and data networks.

Key performance indicators determine if the location network is exceeding, meeting or missing agreed to service levels of the emergency and commercial end-users. Network technicians can easily collect data from the network, quickly access, report and act on collected data to improve overall user experience.

# LocationAssurance Manager®

## Components



### LocationAssurance Device

- TechnoCom test module (6.35" x 3.5" x 1.5")
  - CDMA, GSM, iDEN™
  - Powerful scripting language for autonomous test-event generation
  - High accuracy reference ground truth receiver
    - WAAS enabled
    - Dead-reckoning option
  - Wireless data network for call and status data delivery
- Test Configurations:
  - Mobile
  - Fixed Indoor
- Fixed Outdoor

### LAM Network Server

- End-to-end service testing from the user's perspective
- Automated test scenarios
  - E911 J-STD-36 compliant E2 location
  - AGPS Control Plane and User Plane location
  - Network initiated and mobile originated call flows
- LAD Management
  - Over-the-air updates
  - Call data and status collection via wireless data network
  - Programmable blocking and maintenance windows

### LAM Report Server

- Powerful data correlation for end-to-end service view
- Data rollups and aggregation for KPI reporting
- Intuitive user interface for report definition
- Single-button generation of compliance reports
- On-demand or batch reporting capabilities

To find out more about LocationAssurance Manager, contact:

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