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August 26, 1999

Ms. Magalie Roman Salas
Office of the Secretary
Federal Communications Commission
445 12th Street, SW
12th Street Lobby, TW-A325
Washington, DC 20554

Re: *Ex Parte* Communication in CC Docket No. 94-102

Dear Ms. Salas:

Motorola, Inc. ("Motorola") would like to respond on the record concerning a variety of comments and information provided to the Commission concerning handset testing and location performance in CC Docket No. 94-102. As a leading manufacturer of wireless handsets, Motorola is uniquely positioned to provide insight and real-world experience in this complicated docket.

Background

The Commission, as part of its efforts to implement wireless E911 service, has been flooded with a variety of claims and counterclaims concerning the ability of technology to locate wireless handsets making emergency 911 calls. Motorola has been actively investigating these various technologies and has participated in a number of the tests concerning location systems. As such, and in its position as a wireless handset manufacturer, Motorola would like to clarify some of the misstatements made by others concerning Motorola's assessment or our testing of location technology and our future plans for production of wireless handsets that are location-capable.

I. Use of Motorola StarTac™ in the Tampa Trials.

As part of its comments at the Commission's location roundtable, SnapTrack, Inc. ("SnapTrack"), a third party vendor with a handset-based location solution, indicated that during its trials in Tampa, FL of its location system, a Motorola StarTac™ mobile phone with an integrated GPS antenna was used for the testing data.[1] While this statement is correct in that a handset similar to the one shown at the location roundtable was used in the Tampa trials-this handset was not the primary unit used for obtaining test data. The majority of data from Tampa was collected using an external GPS antenna which was attached to the StarTac™ using a cable;

[1] *See* Comments of Walter Bell of SnapTrack at June 28, 1999 FCC location technology roundtable.

this test platform has approximately an 8 dB performance advantage with respect to the integrated GPS antenna platform. While this level of difference in performance was correctly noted by SnapTrack in its comments at the June roundtable, nonetheless Motorola believes there may have been confusion about which test platform was predominantly used in the Tampa trials. Therefore, Motorola is clarifying for the record that it is inappropriate for the FCC to assume that all test data from the Tampa trials was collected from the integrated GPS antenna handset that was demonstrated at the FCC location roundtable.

II. TruePosition Statements Concerning GPS Antenna Capabilities

In a February 24, 1999 *ex parte* presentation to the Commission, TruePosition, Inc. ("TruePosition"), a third party vendor with a network-based location solution, cited data from T1P1.5/98-348.[2] The data cited in TruePosition's presentation was taken from a submission of statistical data provided by Motorola to T1P1.5 that was later adjusted. This refinement in the statistical analysis was discussed at the July 1998, T1P1.5 meeting where Motorola presented T1P1.5/98-348. Motorola fundamentally agreed with the new approach at that time. In a subsequent submission, T1P1.5/98-397, Ericsson described the improved statistical analysis of Motorola's data, making it available in the public record since August of 1998. The worst-case statistical numbers were derived based on the assumption that three satellites needed to be received to produce a fix, but implicit in the analysis was the simplifying assumption that there are *only* 3 candidate satellites potentially visible in the sky at one time.

This assumption is unnecessarily restrictive, and yielded a worst case result that is a overly pessimistic analysis of the data. This is because, at any given time and location, there are more than 3 candidate satellites potentially visible in the sky (on average, 6 to 8 are potentially available), and only three of these need to be received successfully to produce a fix. Taking advantage of this fact allows any given satellite to have a lower probability of reception while still obtaining a given reliability of producing a fix. In a comment submitted in response to T1P1.5/98-348, Ericsson derived that the correct reliability level to use when interpreting the cumulative distribution function of antenna gain is 0.35, rather than 0.875 as was used in T1P1.5/98-348. Using this reliability criterion, the corrected range of degradation for the data in T1P1.5/98-348 is 6.5 to 17 dB, rather than 7 to 23 dB reported by TruePosition in its *ex parte* filing.

Additionally, in a slide showing a graphical representation of antenna degradation, TruePosition included an additional 4 to 10 dB "patch antenna loss" term, added to the degradation numbers obtained from T1P1.5/98-348. However, the T1P1.5/98-348 results include the performance difference between a reference GPS antenna and a smaller patch antenna, so this 4 to 10 dB should not be included in the analysis (doing so amounts to counting the loss term

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[2] *See Ex Parte* Presentation of TruePosition in CC Docket No. 94-102 filed on February 24, 1999.

twice). Based on these two corrections, the conclusions presented by TruePosition appear to be pessimistic by 4.5 to 16 dB. While Motorola recognizes that there are significant antenna performance challenges to be addressed in assisted GPS (as demonstrated in T1P1.5/98-348), the correct use of the data from T1P1.5/98-348 does not support TruePosition's harsh numerical conclusions.

III. GPS-capable Handsets.

SnapTrack asserted in the June 28th FCC roundtable on location technology that Motorola would be including wireless handsets with GPS chips as a "[s]tandard feature as handsets get deployed going forward."[3] Additionally, as part of its July 2, 1999 reply comments to the Commission's public notice concerning handset-based ALI, SnapTrack contended that Motorola stated that "the earliest it could now produce an ALI-capable handset in commercial volumes is the first quarter of 2001."[4] Additionally, it was intimated at the June 28th location roundtable by a number of the GPS-solution vendors that analog handsets would be retrofitted with GPS chips or otherwise modified to be GPS-capable.

While certainly considering and testing the advantages of utilizing GPS chips within wireless handsets for ALI capabilities, Motorola has not up to this time announced its intention to include GPS capabilities as a standard feature in all wireless units. Since each handset is manufactured to meet the specific needs of the consumer, it is impossible to make a blanket statement about the needs and desires of consumers and therefore impractical to assert that GPS circuitry (e.g. circuits, software, and an additional antenna) will be a standard feature for all future wireless handsets at this point in time. Carriers, as well as infrastructure and handset manufacturers, are still evaluating the various ALI technology options and the industry has not reached a final determination on the most optimal solution or solutions for the various technology platforms that they employ.

Finally, because the market for analog only phones continues to decline and research and development is focused on digital phones, Motorola has no current plans to modify existing analog only platforms to include GPS capabilities. However, Motorola continues to investigate other analog location solutions that do not require a modification to the existing phones (such as an analog in-band call associated location solution implemented in a battery pack or accessory) and may implement such technology.

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[3] *See* Comments of Walter Bell of SnapTrack at June 28, 1999 FCC location technology roundtable.

[4] *See* SnapTrack Reply Comments at p. 13.

Conclusion

Motorola seeks by this *ex parte* filing to aid the Commission in its deliberations concerning E911 location technology and to ensure that these deliberations are grounded in accurate, actionable facts. Motorola urges the Commission to expeditiously resolve the outstanding issues in CC Docket No. 94-102 in order to provide guidance to the wireless industry and permit the timely adoption of standards-based location.

Sincerely,

/s/

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