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January 25, 2015

BY ELECTRONIC DELIVERY

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street S.W.
Washington D.C. 20554

Re: Permitted Oral *Ex Parte* Notice
Wireless E911 Location Accuracy Requirements
PS Docket No. 07-114

Dear Ms. Dortch:

On Friday, January 23, 2015, representatives of NextNav, LLC ("NextNav") met with Rear Admiral David Simpson, Chief of the Public Safety and Homeland Security Bureau ("Bureau"), and David Furth, Deputy Bureau Chief. The undersigned also spoke with Louis Peraertz, legal advisor to Commissioner Mignon Clyburn.

Indoor Metric Requirement

NextNav noted that the express purpose of the indoor location proceeding is to adopt "specific measures in our E911 location accuracy rules to ensure accurate indoor location information."[1] Any draft rules that do not include a specific and enforceable metric to demonstrate accurate indoor location performance (undiluted by outdoor results) will manifestly fail to achieve the express purpose of this proceeding.

The initial proposed rules achieved the Commission's original objective by proposing specific indoor performance metrics in years two and five, with independent test beds to identify compliant technologies and a safe harbor for any carrier implementing technologies that were proven to provide accurate indoor location. The Chairman's draft order extended the initial

[1] Wireless E911 Location Accuracy Requirements, *Third Further Notice of Proposed Rulemaking*, PS Docket No. 07-114, 29 FCC Rcd 2374, ¶ 2 (2014) ("*Third Further Notice*").

timeframes and lowered performance requirements, but also included a measurable and enforceable metric through live call data by establishing performance benchmarks for calls most closely correlated with indoor performance (non-satellite-based location fixes).

The carriers' are incorrect in claiming that a blended metric of indoor and outdoor calls will somehow indirectly encourage sufficient improvements to indoor location.[2] The record is replete with carrier filings, as recently as the last few days, which proclaim GPS location fixes already in excess of 80 percent of E911 calls.[3] An objective observer is left to question both the purpose of the carriers' proposed year three benchmark of 50 percent and the purported challenge of their final year six benchmark of 80 percent in the face of this carrier-provided data.

The carriers' disclosed data of current GPS performance, of course, not only blends indoor and outdoor results, but also blends more difficult urban morphologies (involving significantly reduced indoor accuracy) with far less challenging suburban environments. Testing by the Commission's Communications Security, Reliability, and Interoperability Council ("CSRIC III") revealed the percentage of successful indoor GPS fixes (*i.e.*, yield) in the critical dense urban and urban test areas were as low as 11 percent (dense urban) and 23 percent (urban).[4] This clearly demonstrates that, although the carriers may be receiving GPS location fixes for 80 percent of all indoor and outdoor calls across metropolitan areas, those GPS location fixes are not being produced in significant numbers indoors in urban and dense urban environments.

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[2] *See, e.g.,* Reply Comments of CTIA, PS Docket No. 07-114, at 24 (Dec. 24, 2014) (asserting that the ineffectiveness of outdoor technologies in urban areas will drive carriers to improve indoor performance to comply with the blended metric).

[3] *See, e.g.*, Letter from John T. Nakahata, Counsel to T-Mobile, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 07-114, at 3 (Jan. 22, 2014) (*"T-Mobile Ex Parte"*) (claiming "undisputed" evidence of wide availability of A-GPS for E-911 calls, including 90.9% of recent calls in Washington, D.C. and 87.4% of recent calls in San Francisco); Letter of Nneka Chiazor, Verizon, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket 07-114, at 3 (Sept. 11, 2013) (explaining that 86% of Phase II calls, which were between 91% and 95% of all 911 calls within the five CalNENA jurisdictions, involved GPS-only location); Comments of AT&T, PS Docket 07-114, at 4 (Sept. 25, 2013) (within CalNENA jurisdictions AT&T had more than 78% A-GPS locates).

[4] See CSRIC III WG3, Indoor Test Report to CSRIC III WG3 Bay Area Stage-1 Test Bed (Jan. 31, 2013), available at http://transition.fcc.gov/bureaus/pshs/advisory/csric3/WG3_Indoor_Test_Report_Bay_Area_Stage_1_Test_Bed_Jan_31%20_2013.pdf (last visited Jan. 22, 2014) (aggregating the GPS location fix percentage data for Urban test points on pages 160, 172, 186, 199, and 214, and for Dense Urban test points on pages 77, 89, 102, 116, 131, and 147).

This degree of widely disparate indoor GPS results, with meaningful GPS indoor results only in benign suburban and rural areas, combined with near 100 percent outdoor drive test performance with GPS, exposes the folly of any indoor performance measurement predicated on a combination of indoor and outdoor calls across a broad urban/suburban/rural landscape. For these reasons, this blended approach has been widely and repeatedly criticized by the entire first responder community, the hard of hearing community, NARUC, state regulatory commissions, and others [5] and is contrary to the well-researched and cooperative industry effort of the Commission's CSRIC advisory group (which was ironically co-chaired by two Roadmap signatories).[6]

Given the joint federal/state regulatory responsibility for E911, the views of NARUC hold particular weight. To date, NARUC has strongly supported the Commission's proposed rules and has strongly opposed the weakening of those rules proposed by the carrier Roadmap, particularly the proposed blending of indoor and outdoor results to establish performance benchmarks.[7] Should the Commission adopt such an approach despite the objections of NARUC, the first responder and disability communities and others, it would not only be inconsistent with the express intent of this proceeding, but also a direct reversal of the Chairman's draft order circulated just over two weeks ago, which has the support of those same key stakeholder entities.

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[5] Comments of the National Association of Regulatory Utility Commissioners, PS Docket No. 07-114, at 6 (Dec. 15, 2014) ("*NARUC Comments*") ("*The Roadmap's shift to a benchmark that includes both indoor and outdoor calls, on its face, results in much slower rollout for indoor location accuracy performance. Instead required accuracy requirements are significantly reduced.*") (*emphasis in original*)); Comments of Telecommunications for the Deaf and Hard of Hearing, Inc., et al., PS Docket No. 07-114, at 3 (Dec. 15, 2014) (recommending "assessing both separately, to ensure that improvements in outdoor location accuracy do not artificially inflate progress toward our targets, even if indoor location accuracy were to remain poor"); Joint Comments of Congressional Fire Services Institute and the International Association of Fire Fighters, PS Docket No. 07-114, at 1-2 (Dec. 15, 2014) (describing the blended metrics as "of almost no value").

[6] CSRIC III WG3, E9-1-1 Location Accuracy Final Report v.2, at 10 (June 1, 2012)(available at http://transition.fcc.gov/bureaus/pshs/advisory/csric3/CSRICIII_6-6-12_WG3-Final-Report.pdf) ("*CSRIC Indoor Location Test Bed Report*") ("…indoor testing should have separate performance requirements that are independent of current outdoor testing methodologies"); *id.* at 52 (explaining that "'[i]ndoor location testing is logistically challenging, expensive, and may require differing industry accepted methods of testing,' as compared to currently established outdoor methods").

[7] *NARUC Comments* at 6.

Alternatives to Achieve Indoor Accuracy

NextNav noted in its Bureau meeting that, while it fully supports the draft order as written, and particularly the critical key metric, it could offer three possible alternatives to address carrier concerns. The first alternative would be to accept the carriers' proposed blended metric in the expansive suburban and rural environments, but to enforce the draft order's more meaningful non-satellite based metric only in downtown urban and dense urban environments. This approach accepts the more easily achieved blended call metric where GPS is proven to provide significant positive benefit, but retains the 'indoor proxy' metric of non-satellite based calls in areas where testing has demonstrated minimal indoor benefit from satellite-based location services.

The second alternative would be to return to the original proposed rules to establish compliance benchmarks (although potentially with extended deadlines and lowered performance metrics consistent with the draft order). As originally proposed, an independent test bed in the six ATIS-specified markets would be conducted and the carriers would be provided a safe-harbor upon certification of deployment of any compliant technologies proven to meet benchmark performance. This approach is buttressed by an extensive record, strong NARUC and first responder support, and is consistent with CSRIC findings and recommendations regarding indoor testing approaches. Reporting of live calls in this environment would serve a monitoring and advisory function only.

A third, far less desirable option would be to defer action on the order for a short period (3 months) while the carriers provide the Commission current E911 call results by 'positioning technology' for the six specified ATIS areas to be monitored. The carriers were able to obtain and disclose data similar to this very quickly in 2013 when their call performance was challenged by CalNENA, so it is not unreasonable to require such underlying data be provided. This would give the Commission a documented record of live call data upon which to establish appropriate indoor performance metrics for the next six years.

The test bed procedures and findings are well understood and documented. The draft order's establishment of non-satellite based call percentages also has support in the record given the ability of multiple non-satellite based technologies to achieve the desired performance percentages (initially 50 percent and eventually 80 percent). Predicating indoor location improvements and performance metrics on a combination of indoor and outdoor live calls, however, has no technical or data support in the record and is contrary to existing CSRIC recommendations. Setting an appropriate indoor performance percentage is so central to the overall viability of this order that the lack of data to support any particular percentage for blended calls is troubling.

Reporting and Test Bed Verification

Regardless of the approach adopted by the Commission, the meeting participants discussed the requirement of having the carriers provide quarterly reports to the Commission and to PSAPs on actual location performance in each of four morphologies – dense urban, urban, suburban and rural.[8] Such reports, however, will serve little purpose if they are not tied to an enforceable indoor performance metric (*i.e.,* within 50 meters) that must be achieved in each morphology.

The parties also discussed the need for the performance capabilities of all location technologies – including dispatchable location technologies – to be demonstrated in a test bed prior to their use to provide emergency location information to first responders.[9] Such testing must demonstrate the specific level of accuracy of such technologies, rather than assume that any address transmitted by dispatchable location technologies equates with the accurate location of the caller. Further, the carriers should be required to demonstrate that the actual deployment of dispatchable location technologies in their served communities is comparable in scope and capability (not just density) to deployments in test beds, just as is required for any other location technology. To this end, it is ironic that the carriers repeatedly tout their ability to provide dispatchable location information, but resist being required to comply with metrics based on latitude, longitude and altitude requirements.

Vertical Location Accuracy

The NextNav representatives also discussed the critical need for precise vertical location information in urban and semi-urban communities – again, a critical element in this indoor location proceeding. The Roadmap's pledge to transmit uncompensated barometric pressure sensor data to PSAPs within three years will serve little purpose because, as the carriers have repeatedly acknowledged, local weather conditions will significantly affect the accuracy of the

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[8] *See* ATIS Technical Report 0500011 – Define Topologies & Data Collection Methodology (2007) (providing definitions of the wireless usage environments as used in CSRIC studies and elsewhere).

[9] Joint Reply Comments of the International Association of Chiefs of Police, International Association of Fire Chiefs, National Association of State Emergency Medical Services Officials, National Sheriffs Association, and National Volunteer Fire Council, PS Docket No. 07-114, at 2 (Dec. 24, 2014) (arguing that "[t]he FCC must ensure that technology is evaluated in a test bed and judged by use of performance criteria. Those providing an accurate dispatchable location or within 50 meters on the x and y axis and within 3 meters on the z-axis (as outlined in the FCC's proposed rules) should be usable technologies for indoor location").

data.[10] Further, the Roadmap proposes waiting three years before even establishing a vertical accuracy metric for year six (a deadline, it should be noted, that falls nearly a decade after CSRIC testing demonstrated accuracy in the 3 meter range).[11] A more reasonable approach would be to establish the 3 meter requirement to be met by year six, and then modify the objective if needed following additional independent testing.

Numerous vendors, including TruePosition and Polaris, have explained their ability to use various technical approaches to provide accurate Z-axis readings.[12] Parties as diverse as RX Networks and Bosch offer local weather calibration capabilities to any party wishing to use them. Bosch, the world's leading manufacturer of pressure sensors, has placed into the record the underlying accuracy of its devices, directly contradicting recent claims to the contrary.[13] Certainly, NextNav's local calibration capabilities to meet the 3 meter metric have been well documented through CSRIC and elsewhere,[14] and have been subject to live demonstrations in numerous environments for many in public safety, industry and the Commission. Contrary to recent assertions by T-Mobile, the pressure sensors used by NextNav in the CSRIC trials to achieve accurate vertical results are commercially available Bosch sensors used in many smartphones today. Therefore the Commission would be on well founded ground by specifying a metric that was proven in the 2012 open test bed established by CSRIC III.

The NextNav representatives noted as well that standardization of the Metropolitan Beacon System ("MBS") technology which it pioneered is expected in 3GPP Release 13 slated for this year, the specifications for which are already publicly available as an open standard on

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[10] *See, e.g., T-Mobile Ex Parte* at 8.

[11] *See CSRIC Indoor Location Test Bed Report* at 51 (noting that testing was carried out in late 2012, meaning that the proposed six year deadline from today would not be until 2021, nearly 10 years later)

[12] Comments of TruePosition, PS Docket No. 07-114, at 22-23 (May 12, 2014) (regarding its own capabilities "there is no question that technology is available to meet the FCC's proposed [vertical] location standards"); Comments of Polaris, PS Docket No. 07-114, at 5-7 (May 12, 2014) (stating it is "confident that [Polaris'] hybrid vertical estimation solution will meet the Commission's proposed vertical location accuracy requirement within the proposed timeframe"); *contra T-Mobile Comments* at 7-8.

[13] Comments of Bosch Sensortec, PS Docket No. 07-114, at 4-5 (May 12, 2014)

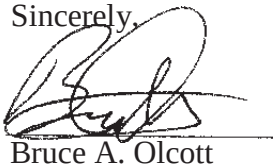
[14] *See generally* Letter from Bruce A. Olcott, Counsel, NextNav, LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, PS Docket No. 07-114 (filed Aug. 14, 2013) (providing results of NextNav's Rev.2 indoor location testing).

the NPSTC website.[15] Therefore, although there are also additional technologies such as RF Pattern Matching and UTDOA and crowd-sourced Wi-Fi that can likely meet the draft order's performance metrics, any carrier or entity that wishes to utilize MBS technology to meet the order's performance metrics is able to do so without reliance on NextNav's particular implementation.

Participating in the Bureau meeting on behalf of NextNav were Gary Parsons, CEO of NextNav; Ganesh Pattabiraman, President and Co-Founder of NextNav; and Bruce Cox, Senior Director, Regulatory & Public Safety, and the undersigned.

Thank you for the Commission's continued effort to address the growing wireless indoor location accuracy problem. Please contact the undersigned if you have any questions.

Sincerely,



Bruce A. Olcott

[15] *See* New SID: Study on Indoor Positioning Enhancements to UTRA and LTE, 3GPP, RP-141003 (June 13, 2014); *see also* Metropolitan Beacon System (MBS) ICD VersionG1.0 (available at http://www.npstc.org/download.jsp?tableId=37&column=217&id=3219&file=NextNav_MBS_ICD_vG1%200_20141024.pdf).