STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

RE: APPLICATION BY T-MOBILE NORTHEAST LLC FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR A TELECOMMUNICATIONS FACILITY AT 232 SHORE ROAD IN THE TOWN OF OLD LYME, CONNECTICUT

DOCKET NO. 391

Date: May 10, 2010

SUPPLEMENTAL PRE-FILED TESTIMONY OF SCOTT HEFFERNAN

The following pre-filed testimony supplements my pre-filed testimony filed on January 28, 2010, regarding the Application for a Certificate of Environmental Compatibility and Public Need for a telecommunications facility at 232 Shore Road, Old Lyme, Connecticut ("Facility") submitted by T-Mobile Northeast LLC ("T-Mobile"). This supplemental testimony is responsive to the Connecticut Siting Council's request for general information on Outdoor Distributed Antenna Systems ("Outdoor DAS") and their suitability for rural areas, such as the Town of Old Lyme. I understand that T-Mobile has a number of legal objections to the questions below based on federal law and preemption. Notwithstanding and without waiving these objections, I provide my supplemental testimony below in an effort to expeditiously resolve the pending application.

Q12. Is it possible to utilize DAS technology in the area to be served by the proposed Facility, particularly along Amtrak rail line?

A12. No. Outdoor DAS is not a feasible deployment technology for the area to be served by the proposed Facility.

(1) The area to be served by the proposed Facility is not confined to the Amtrak rail line, rather it also encompasses Route 156, Mill Creek Road, Hawks Nest Road and Cross Lane just south of Interstate 95, and the surrounding area.

(2) While it is difficult to respond to this question with specificity due to the absence of an existing concrete Outdoor DAS plan, based on a review of the existing conditions found in the area where the Facility is proposed, an Outdoor DAS system faces a panoply of technical problems, including, but not limited to:

(A) The unavailability of a sufficient number of existing utility poles on which to string fiber-optic cable and install Outdoor DAS nodes;

(B) The general, relatively low height of those utility poles that do exist and might be used for the DAS nodes;

(C) The existing, uneven terrain and mature vegetation, which would prevent Outdoor DAS nodes from providing reliable coverage throughout the area where there is currently a gap in coverage;

(D) The unavailability of unused fiber-optic cables ("dark fiber"), to serve as the backbone for the Outdoor DAS network;

(E) The need to access easements, enter pole attachment agreements to use the various utility poles, and/or secure conduit agreements, the complexity of which is compounded by the large number of DAS nodes necessary to provide reliable wireless service over the coverage area which the proposed Facility is designed to serve;

In designing Outdoor DAS systems, these items and others must be studied before any technical design can be performed. Failure to do so can cause a major flaw in the Outdoor DAS network design relative to coverage and capacity. It is for these reasons that Outdoor DAS networks are typically deployed only in limited circumstances where a traditional macro-cell site cannot provide reliable coverage and a DAS system is shown to be a better alternative. Furthermore, today's wireless systems provide enhanced communications beyond just voice along the roadways or transportation corridors, such as the Amtrak line. The demand to provide reliable in-building coverage

for voice and data communications, as well as to provide for enhanced 911 access, is a paramount requirement in today's wireless environment.

As a general overview, in an Outdoor DAS system, the base station equipment is located at the end of the fiber run(s). The information is then transferred from pole to pole via fiber-optic cable from a base station hotel to each of the pole attachments. In essence, the wireless system becomes a mesh of wires connecting all of the end points or "nodes." Ultimately, what started out as a wireless system becomes a hybrid wired/wireless network. Moreover, Outdoor DAS systems generally rely upon low-powered nodes (with the available output power at each node shared by one or more wireless carriers) that use short omni-directional antennas or lower gain panel antennas with limited choices for patterns. These limitations make it difficult for a carrier to maintain control over the design and optimization of a wireless network. By contrast, traditional macro- cell site architecture allows a wireless provider to use directional antennas, specific antenna patterns, and customized orientation or down tilt to allow for optimum coverage and minimal interference. Using antennas that can focus in on one specific direction, also known as "sectorization," is especially important to avoid interference over 3G wideband CDMA networks like the one T-Mobile operates.

By way of additional background, T-Mobile is in the business of providing wireless services to customers using a national network of more than 40,000 independent cell sites. T-Mobile is not a certified telecommunications provider in Connecticut, and thus it does not possess the regulatory authority necessary to secure pole attachment rights and/or gain access easements, both of which would be critical in constructing an Outdoor DAS system in the area in question.

The combination of these factors makes the operation of a DAS network over such a large geographic open area infeasible, especially for T-Mobile, and these issues are thus among the many reasons why most DAS networks are deployed in controlled / confined environments.

Q13. How many DAS locations would be needed to provide coverage to the area that would be covered by the proposed Facility?

A13. It is difficult to provide an accurate response to this question, given the technical challenges noted in the response to Question 12. As discussed above, DAS is not a preferred solution in any large, open area such as the one involved in this application, but the lack of available existing infrastructure in the subject area (including suitable utility poles, dark fiber, and easement access) makes it particularly unsuitable for Outdoor DAS deployment. Because the existing infrastructure in the area does not provide a good basis for deploying Outdoor DAS, there is not a ready means of plotting out potential Outdoor DAS node locations and, thus, there is no simple means of determining with specificity how many Outdoor DAS nodes would be needed (since the number of nodes required ultimately will depend on where each node can be located).

With that said, and in the absence of a detailed engineering study, as a very rough estimate, the breadth of the area at issue would likely require T-Mobile to acquire and/or construct a significant number of Outdoor DAS sites, perhaps more than forty-five (45) DAS nodes, to cover the total coverage objective for all three telecommunications facilities proposed in Old Lyme (Docket Nos. 391, 392 and 393). This number may grow taking into account the uneven terrain and mature vegetation and the addition of additional frequencies or other carriers.

Q14. <u>What would be the estimated cost of such a DAS system?</u>

A14. As discussed in the response to Questions 12 and 13, there are a number of serious technical issues that would make deployment of a DAS solution infeasible in this case, and that make it difficult to even estimate the precise number of Outdoor DAS nodes that would be required to provide service. These technical barriers include a limited number of suitable utility poles on which to place nodes, a lack of available dark fiber to connect the nodes, and a lack of access to easements in which to place nodes and the requisite fiber equipment.

Given these technical barriers, it is not possible to provide a realistic cost estimate for deploying an Outdoor DAS in this case. The significant drivers of cost for an Outdoor DAS include, but are not limited to, engineering and design work, the number of nodes required, the types of antennas, back-up power supplies and other equipment at each node, the number of new facilities needed (such as new poles or other structures) to accommodate the placement of these nodes, the cost of gaining access to rights of way, vaulting costs if any of the node equipment needs to be installed *below* ground, and the cost of constructing the infrastructure necessary to connect the nodes where existing infrastructure cannot be used.

Here, the engineering factors set forth in the response to Question 12 counsel so heavily against the use of Outdoor DAS that it is difficult or impossible to determine even how many nodes would be required or where the fiber would run to connect these nodes. As a result, there does not appear to be any way to easily quantify the cost of constructing a DAS.

Q15. <u>What would be the process for obtaining the necessary easements for installing a DAS system in this area? From whom would such easements be necessary?</u>

A15. These questions are difficult to answer, and as discussed in the response to Question 12, T-Mobile does not have the operating authorities it would need to build, operate and maintain an Outdoor DAS system over public and private rights of way within the State of Connecticut and within municipal rights of way.

From T-Mobile's general knowledge, the minimum requirements would include: permission from the entity or entities (i.e. utility companies or municipalities) controlling the existing infrastructure, which includes proper agreements for each potential DAS node, as well as necessary access rights for each potential DAS node, which may involve utility providers, state and local governments and related agencies. As noted above, dark fiber to support each potential DAS site would also be required. Without existing dark fiber it would be necessary to install new fiber, either above or below ground. The issue of back-up power is also an important consideration, which would require additional permissions, by way of easement or similar arrangements. Back-up power must be available at the hub of the DAS system and at each node to avoid a situation where a generalized power failure in the area where the Outdoor DAS system is deployed results in simultaneous failures of the network for multiple wireless service providers and endangers public safety. Putting back-up power systems in place at DAS nodes is typically much more difficult than getting back-up power to a macro cell where there is generally more space to install back-up generators or batteries (and, of course, macrocells require fewer such installations, since there are fewer transmitting locations). If additional back-up power is needed at each node, it can make the Outdoor DAS

provider's job of securing necessary easements and other operating authorities more complicated as well as significantly drive up the costs for the wireless providers that chose to implement an Outdoor DAS solution.

Even if an Outdoor DAS system could theoretically provide equivalent coverage (which, for the reasons explained above, it cannot), T-Mobile has an immediate need for the proposed Facility. Accordingly, Outdoor DAS is neither an available nor technologically feasible alternative to the proposed facility. Even if federal law permitted the Council to require consideration of an Outdoor DAS, which it does not, federal law does not permit the denial of a personal wireless facility siting application on the basis of a purely hypothetical alternative.

Scott Heffernan

Sworn and subscribed to before me this
10th day of May, 2010.

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Notary Public
My Commission expires