

**July 5, 2018**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, SW  
Washington, DC 20554

**Via Electronic Filing**

**Re: NOTICE OF EX PARTE**  
**WT Docket No. 10-208:** *Universal Service Reform –*  
*Mobility Fund*  
**WC Docket No. 10-90:** *Connect America Fund*

Dear Ms. Dortch:

The undersigned represent a coalition of radio frequency engineering firms that serve mobile wireless carriers across the country (Coalition). Many of our clients are members of the Rural Wireless Association, Inc. (RWA) and/or the Competitive Carriers Association (CCA). The Coalition has determined that Verizon's claimed 4G LTE coverage is grossly overstated and not supported by rational RF engineering practices.

We note that RWA has expressed serious concerns<sup>1</sup> regarding overstated unsubsidized 4G LTE coverage as it relates to eligibility for Mobility Fund Phase II (MFII) funding.<sup>2</sup> CCA, too, has expressed concerns regarding the credibility of claimed 4G LTE coverage.<sup>3</sup>

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<sup>1</sup> [Ex Parte Letter](#) to Ms. Marlene H. Dortch, Secretary, FCC, from Caressa D. Bennet, General Counsel, Rural Wireless Association, Inc., WT Docket No. 10-208, WC Docket No. 10-90 (Apr. 20, 2018) (*April 20 Ex Parte*).

<sup>2</sup> On February 27, 2018, the FCC released a [map](#) showing areas across the United States initially deemed eligible to receive support for the deployment of 4G LTE service. On April 10, 2018, the Commission made available a second map of areas initially deemed ineligible for MFII support due to qualifying, unsubsidized coverage reported by only one mobile carrier.

<sup>3</sup> See FierceWireless, [FCC's Mobility Fund II Will Primarily Benefit Western Half of U.S.](#), Kendra Chamberlain (Feb. 28, 2018) (quoting CCA President and CEO Steven Berry "CCA has been a fervent supporter of Congress's goal and the Commission's efforts to use reliable data to determine eligible areas for support in Mobility Fund II based on an efficient challenge process that is robust, targeted, and strikes a reasonable balance without overly burdening small carriers...Unfortunately, that is not possible based on the initial eligible areas map that the FCC released today. It is now clear that the parameters the FCC directed carriers to use in its one-time data collection have failed to produce a credible map of eligible areas, and it is most

The 4G LTE coverage maps submitted by carriers in response to the Commission's one-time data collection are supposed to represent qualified mobile 4G LTE coverage with download speeds of 5 Mbps at the cell edge with 80 percent probability and a 30 percent cell loading factor.<sup>4</sup> Overstated coverage by Verizon, a national carrier, requires an enormous amount of testing to challenge coverage areas that should not be claimed. To test the entire area in question requires more time and resources than are available to small rural wireless carriers who rely on the very universal service support at risk.

Since discussions surrounding the MFII process began, one rural carrier, Panhandle Telecommunication Systems, Inc. (Panhandle), an Oklahoma rural wireless carrier, has served as the poster child for the problems caused by grossly overstated coverage. Over the past three years, Panhandle has studied Verizon's local coverage using publicly available data. Panhandle hired Monte R. Lee and Company (MRL), a professional engineering firm and a member of the Coalition, to estimate Verizon coverage using specific cell site locations, observational estimates of radio height and antenna placement on towers, 700 MHz spectrum, and service that reflects the customer experience. The Oklahoma Panhandle has a total area of 14,778.47 square kilometers. Using publicly available information, and with the aid of a newer modeling tool and the FCC-adopted 5 Mbps downlink standard, MRL determined that Verizon's coverage area should be approximately 6806.49 square kilometers – nearly half of the LTE coverage area Verizon publicly claims to serve.<sup>5</sup> A map showing this predicted coverage was included with RWA's *April 20 Ex Parte* filing.<sup>6</sup>

Panhandle has since undertaken efforts to drive test areas in its service territory. Below are real-world drive tests taken using Verizon-specified devices that are on plans not subject to network prioritization or throttling.

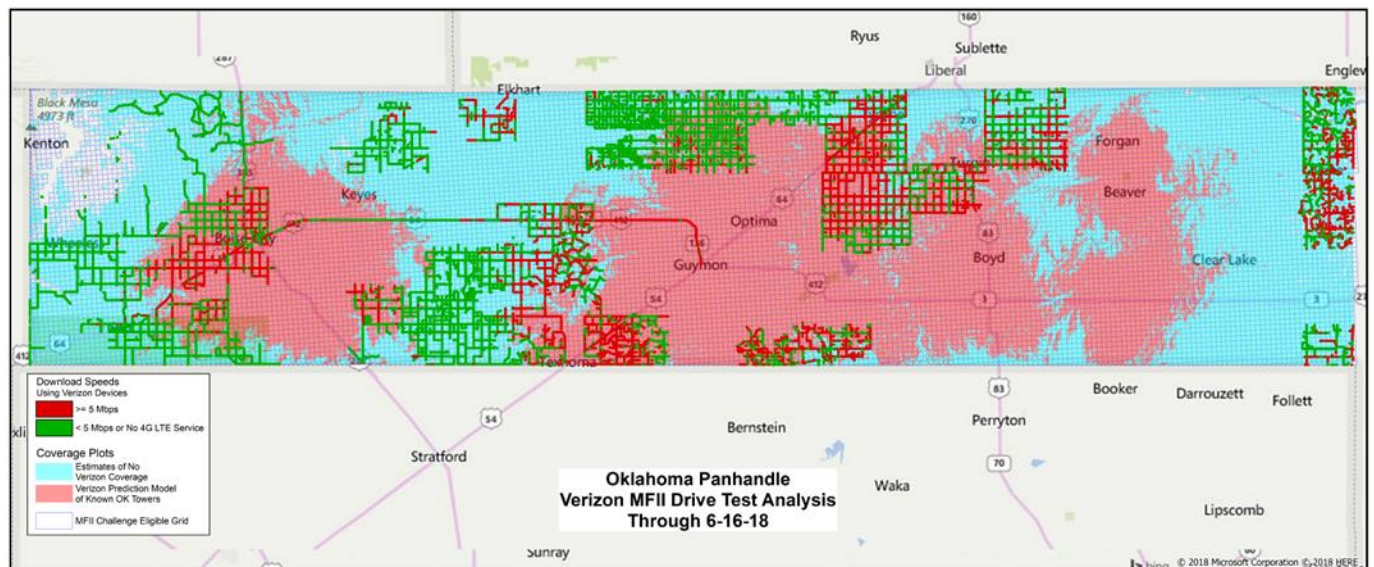
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disappointing that absent significant changes, the Commission will fall short of Congress's mandate for Universal Service.”).

<sup>4</sup> *Instructions for Filing 4G LTE Coverage Data to Determine Areas Presumptively Eligible for Mobility Fund II Support*, [Public Notice](#), WC Docket No. 10-90, WT Docket No. 10-208, DA 17-926, at ¶ 1 (Sept. 22, 2017).

<sup>5</sup> [Verizon Wireless Interactive Map](#) (last visited June 28, 2018) (showing 4G LTE coverage throughout nearly all of the Oklahoma Panhandle).

<sup>6</sup> *April 20 Ex Parte*, at p. 6 of [Attachment C](#).



This map of the Oklahoma Panhandle indicates the testing completed by Panhandle as of June 16, 2018. The red areas indicate test points receiving 5 Mbps or higher and the green areas represent tests below 5 Mbps or those that did not register 4G LTE service. The pink is an estimate by MRL of service area for Verizon and the blue area indicates estimated area of less than 5 Mbps down load speed or no LTE coverage by Verizon. Verizon publicly claims to provide 4G LTE service throughout most of the depicted area.<sup>7</sup>

Panhandle's data collection depicted on the map above covered 4,911.84 miles (7,904.84 kilometers) and a total of 402,573 test points. Of the total test points collected, 357,374 (88.8%) tested below 5 Mbps download speed or did not register 4G LTE service at all on Verizon-designated handsets. MRL is aware that Panhandle has spent more than \$300,000 since the MF-II Challenge Process opened on employee wages, testing handset and data expenses, regulatory and engineering consulting fees, wear and tear on vehicles, and fuel for its testing vehicles, and Panhandle is estimated to spend an additional \$650,000 to complete the challenge process if the overstated coverage is not corrected. In addition to hard out of pocket expenses, Panhandle is losing out on opportunities to expand its LTE footprint and has delayed the planning process for 5G implementation due to staff being occupied with the Challenge Process.

In light of these real-world examples that highlight concerns regarding Verizon's overstated coverage in the Oklahoma Panhandle, we are providing the following RF engineering observations and posing questions for FCC staff to address to determine if Verizon has indeed overstated its coverage.

<sup>7</sup> [Verizon Wireless Interactive Map](#) (last visited June 28, 2018) (showing 4G LTE coverage throughout nearly all of the Oklahoma Panhandle). Verizon's public map is not far removed from the coverage depicted in the portal.

## **LTE RSRP Level**

- How were Verizon's fade margin values derived?
  - Verizon's RSRP level calculated via the link budget used to meet the 80% reliability at the cell edge for the MF-II coverage map requirement is suspect in a majority of cases.
  - Cases where the fade margin is already included in the link budget before the coverage plot is done are cause for concern because the signal level to achieve 5 Mbps will become significantly lower than the actual requirement after comparing signal level (RSRP) with a nominal value in the field where 5 Mbps is achieved. Fade margin should also be based on standard deviation achieved from completing the model tuning instead of a general assumption.

We believe this has contributed to an overstatement of coverage. As such, the Commission should require Verizon to re-evaluate the data utilized for its MF-II coverage map and instead utilize the terrain data for different regions and topographies for its reported 5 Mbps download speed. In cases where the model(s) are inaccurate, Verizon should correct its model(s) and provide a revised map depicting the actual coverage speeds associated with varying terrain along with statistical data that accounts for the variations in terrain.

## **Propagation Model and Clutter Factors**

- What kind of propagation model did Verizon use? Was it calibrated for different topographies and regions of the country? Was clutter height a dominant factor in Verizon's propagation model?
  - An uncalibrated model may not line up satisfactorily with actual RF measurements, and a single propagation model (either calibrated or uncalibrated) is not appropriate for the entire U.S., which has a range of topographies and geographic diversity. Clutter losses, diffraction losses, or other constants or variables must be optimized for each area to yield accurate coverage.
  - The submitted clutter information doesn't reflect a variety of values collected from different geographical regions (i.e., variable clutter loss min/max is a narrow range and constant clutter loss min/max is the same across the country). As a result, the propagation model(s) being used are uniform across a large geographic area, possibly the entire U.S.
  - Most propagation models use clutter loss and clutter height and/or land use GIS information as an integral part of the propagation modelling.

- Where the model is not optimized or calibrated correctly and there is a zero or otherwise improper setting on clutter input, coverage will be greatly overstated and fail to comply with the FCC's filing instructions.
- As a supplement to the January 4, 2018 maps, the FCC required a spreadsheet with the RF losses associated with each clutter type to be submitted.
- Per Commission instructions,<sup>8</sup> for each clutter category, the values of at least one of the clutter loss ranges, variable or constant, must be greater than zero. Using zeroes for all four clutter inputs when representing any type of rural environment would create a much larger coverage area, especially areas such as freeways, highways, surface streets and grasslands.
- The FCC's input requirements for clutter data did not require clutter height. Although other carriers inputted clutter height data in determining their coverage calculations, it appears Verizon did not – contributing to its overstated coverage. If clutter height had been factored into Verizon's propagation model, it would accurately depict coverage and fall in line with rational RF engineering practices.

We advise the Commission to require Verizon (and other carriers) to refile its coverage maps to include the clutter height data to correct its overstated coverage.

Based on our professional experience, Verizon's coverage is overstated due to lack of critical data on the front end of its model process implementation or GIS processing. We realize that the Commission envisioned coverage challenges taking place within the confines of the USAC portal, but significantly overstated coverage by a nationwide carrier is swallowing the orderly challenge process that the Commission established by preventing prospective challengers' from mounting targeted and timely challenges. We have urged Verizon to remedy its overstated coverage, but are concerned that Verizon will not do so without specific Commission direction. We now urge the Commission to further investigate, and require re-filing of Verizon's data where warranted to comport with standard RF engineering practices.

We stand at the ready to meet with the Commission to further elaborate and provide supporting data for our analysis.

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<sup>8</sup> Federal Communications Commission, [How Should I Format My Clutter Data?](#), at p. 1, modified Oct. 6, 2017.

Pursuant to Section 1.1206 of the FCC's Rules,<sup>9</sup> this ex parte is being filed electronically with the Office of the Secretary.

Best regards,

/s/ Mark Seagren

Mark Seagren  
CTO/Senior RF Engineer  
**4G Unwired, Inc.**

/s/ Lynn R. Merrill, P.E.

Lynn R. Merrill, P.E.  
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**Monte R. Lee and Company**

/s/ Howard Gorter, P.E.

Howard Gorter, P.E.  
Executive Vice President, Engineering  
Operations  
**Palmetto Engineering & Consulting**

/s/ Jeff Little

Jeff Little  
President – Central Division  
**CT&T, a PEC Company**

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<sup>9</sup> 47 C.F.R. § 1.1206.