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September 30, 2016

**VIA ELECTRONIC FILING**

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

Re: WC Docket No. 16-70

Dear Ms. Dortch:

Attached please find a declaration by Roland Hicks, Vice President of Network Planning for Verizon, that describes how the acquisition of XO Communications LLC will enable Verizon to expand 4G and deploy upcoming 5G services more quickly and efficiently than if Verizon were to build fiber or attempt to lease it from a third party.

Mr. Hicks explains that building out a 5G network will rely on higher band millimeter wave spectrum and will require higher cell density, and that “means a greater number of fiber connections back to the network, as every cell site must connect to the rest of the network.” XO’s fiber “will enable faster network densification for

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Please contact the undersigned should you have further questions.

Respectfully submitted,

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Attachment

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**DECLARATION OF ROLAND W. HICKS JR.**

1. I am Vice President of Network Planning for Verizon, a position I have held since 2013. In this role, I am responsible for planning the evolution of Verizon's network infrastructure to support increased efficiency, higher performance and the introduction of new/enhanced products and services. Prior to this role, I was Vice President of Multimedia Networks Services for Verizon, and was responsible for the engineering and implementation of global wireline networks that support consumer, enterprise, and wholesale video, data, and voice services. Additionally, I oversaw the video operations team that supported broadcast and on-demand content acquisition, transformation, grooming, delivery, and ad-insertion. I also served as Vice President of Network Engineering and Planning, leading a team that planned, designed, and provisioned Verizon's wireline infrastructure across 5 regions, encompassing 19 million access lines in 18 states. I have spent 30 years with Verizon and its predecessors, serving various roles of increasing responsibility since joining NYNEX as an engineer in 1986.

2. In my current position, my responsibilities include planning for the use of backbone networks across Verizon's lines of business, including wireless.

3. The acquisition of XO's fiber assets will provide an immediate and meaningful expansion of Verizon's metro-area fiber networks. These fiber networks are, or will be, used to provide the essential connections for our 4G and future 5G wireless networks. The acquisition of XO will enable Verizon to expand 4G and deploy upcoming 5G services more quickly than if we built that fiber ourselves or attempted to lease it from a third party. With respect to 5G in

particular, in order to test 5G service, we need to expand and densify our wireless network with many additional small cells. Those 5G small cells need to connect to our core network using fiber. The faster we can perform 5G network testing, the faster we can see how the technology functions best in a real-world environment and assess the best way to roll out 5G service.

4. Adding XO's existing fiber to Verizon's inventory, particularly in areas where our current fiber inventory is limited, will allow us to deploy small cells more quickly than having to build new fiber ourselves, and more efficiently than through a lease. Because XO's fiber network footprint is largely complementary to Verizon's existing fiber facilities, the addition of XO's assets will thus allow us to deploy more small cells on our own fiber network in more areas. While there are many instances in which building new fiber is the right competitive answer, adding XO's fiber to Verizon's fiber holdings will help us deploy small cells faster and more efficiently. XO's fiber thus enables us to further support our growing 4G service right now, rather than wait for leased or newly built fiber. And XO's fiber will allow us to deploy 5G service using small cells more quickly once we have completed our market testing. Further, once we install a small cell for 4G LTE and connect it to the core network with fiber, we can use the same fiber to serve a 5G small cell at or near that location once we start deploying 5G service on a commercial basis.

#### *Network Densification and Networked Connectivity*

5. To meet the ever-growing demand for wireless data, Verizon currently deploys thousands of new wireless cell sites, and likewise upgrades thousands of existinw 5a

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**HIGHLY CONFIDENTIAL INFORMATION]** These figures are projected to increase each year to meet the demands of our customer base and as we deploy 5G on a commercial basis.

6. Building out a 5G network will require higher cell density due to the higher band millimeter wave spectrum that we will use to deploy 5G. This spectrum's propagation characteristics limit the distance signals can travel. Millimeter wave spectrum is also susceptible to more interference (e.g., from rain, leaves, buildings). So we will need to deploy a great number of small cells in order to enable 5G signals to reach consumers.

7. More cell sites (both 4G and 5G) means a greater number of fiber connections back to the network, as every cell site must connect to the rest of the network. Such connectivity includes: (i) "backhaul" connections from radio signal-processing equipment (baseband units) to mobile switching centers; (ii) "fronthaul" connections between a small cell's antennas and the baseband unit to the extent such baseband units are not collocated with the radios and antennas; and (iii) transport connections between switching and distribution centers in the core network.

8. The faster we can deploy connectivity to the network, with sufficient capacity, the faster 5G cell sites – and our 5G network – can provide groundbreaking services and meet growing demand. We also will continue to expand our 4G network to handle increasing demand as well, and this will require additional sites that need fronthaul and/or backhaul, as well as the need for transport facilities.

*Role of Fiber in a Wireless Network*

9. Fiber today is almost always the preferred medium for connectivity in a wireless network, as it provides superior reliability and carrying capacity.



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**[END CONFIDENTIAL INFORMATION]** Copper facilities supporting services such as DS1 or multiple DS1s historically were deployed as backhaul service to macro cell sites, and they generally cannot support those levels of throughput.

14. Because of the benefits of fiber, today, we connect over **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** of new cell sites with fiber facilities. With 5G, our reliance on fiber likely will only increase.

15. In the case of 4G cell sites deployed today, where the baseband unit and the antenna are collocated, those sites typically connect to the network **[BEGIN CONFIDENTIAL INFORMATION]** **[END CONFIDENTIAL INFORMATION]** depending on customer demand in the area served by a particular site. We expect that 5G cell sites will transmit tens of Gbps. Given the cell site densification required for 5G, we thus project that we will need to increase fiber capacity substantially when we start to offer 5G on a commercial basis.

16. The need for fiber is not limited just to new cell sites. Existing 4G sites that do not have fiber facilities already in place may need fiber for additional capacity. Once fiber is in place, we can increase that capacity easily; copper facilities often cannot carry the increased capacity. And, as mentioned above, once fiber is present at that location, it can support 5G cells that are placed at or near that location.

*Ways to Acquire Fiber*

17. As a general matter, in addition to constructing our own fiber facilities, Verizon has a number of viable ways to obtain fiber to support its services. For example, in some

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instances, we purchase from other providers “lit” services, such as Ethernet, that come with the electronics and equipment necessary for the circuits to function and carry traffic. At other times, we may lease dark fiber facilities, and add the electronics and equipment necessary for the circuits to function and carry traffic. Both of these options may make sense if that fiber is appropriately located or if we can negotiate contracts quickly and efficiently. Where fiber facilities are already in the ground at a particular location, we can connect multiple new cell sites to that fiber in a matter of weeks. That allows us to more quickly deploy new cell sites for 4G and 5G.

18. In some instances, however, acquiring fiber is preferable to purchasing “lit” services or leasing or purchasing dark fiber from other providers. Today, Verizon is on the cutting edge of testing and developing 5G equipment and technology. As we conduct 5G testing to determine properties and use cases, adding the XO fiber to our network offers us the flexibility to test capacity and power requirements, to test optimal small cell placements, and to expand bandwidth requirements quickly. So acquiring XO’s fiber will help us in this regard, allowing us to expand the areas in which we can test and deploy 5G. And of course, it will also allow us to deploy 5G service more efficiently.

### *XO’s Fiber*

19. Since XO’s fiber is already deployed and immediately available for use – particularly outside of Verizon’s ILEC footprint where we have less Verizon-owned fiber available – it will enable faster network densification for both 4G and 5G. In particular, XO has fiber located in a number of cities, including some that are initially targeted for potential 5G pre-commercial market trials in 2017. Below are two examples in 5G test markets illustrating ways

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XO's fiber facilities will enhance small cell densification and expedite our 5G deployment. XO's fiber facilities will allow us to expand the coverage area in one test market by at least [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] beyond what we had originally planned. A third example is provided as well, showing how XO's fiber would aid Verizon's small cell deployment – in this case providing approximately [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] of the facilities we otherwise might have built or leased, meaning we can deploy small cells that much more broadly and quickly.

20. [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] We are targeting [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] as one of a handful of cities for a pre-commercial market trial of 5G in 2017. In [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION], obtaining access to XO's network will provide us [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] miles of fiber to help deploy 5G for testing next year. XO's fiber assets allow us to expand the test footprint by approximately [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] beyond our original plan.

21. Appendix 1 demonstrates how XO's fiber will help facilitate the 5G trial in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY

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**CONFIDENTIAL INFORMATION]** The circles show two target areas for the trial, each with a circle radius of five kilometers reflecting the current average limitation on fronthaul for 5G pre-commercial equipment. The green routes show where XO's fiber is located. Adding XO's fiber within each of these two areas will thus allow us to expand the footprint served within the two areas by **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]**

22. XO's fiber will augment our 5G trial in a number of ways. For example, we can potentially use XO fiber in the targeted trial areas for fronthaul to connect 5G small cell antennas and baseband units. We could also use the XO fiber for backhaul from a 5G baseband unit back to the core network and/or for transport between switching and distribution centers in the core network. For backhaul and transport connections, Verizon will be able to use common locations of Verizon Enterprise Solutions and XO to cross connect fiber facilities and thus avoid having to create a new hub facility for that purpose. For example, we can cross connect fiber facilities in **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

**[END HIGHLY CONFIDENTIAL INFORMATION]**, where both Verizon Business and XO house fiber facilities. These locations can serve as hubs between the two networks. Owning these new fiber facility options should help us launch the trial more quickly and across a broader area than if we had to seek access to fiber in other ways. For example, there is typically a **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** month period of negotiation and design (in addition to any construction) when Verizon accesses fiber from a third party.

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23. [BEGIN HIGHLY CONFIDENTIAL INFORMATION]

[END HIGHLY CONFIDENTIAL INFORMATION] We are also targeting [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] for a pre-commercial market trial of 5G in 2017. In [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] XO's approximately [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] miles of fiber will help us deploy 5G testing more quickly and efficiently next year. Appendix 2 includes a circle that shows the initial test locations that we are planning. As in the other cities, XO's fiber in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] is helpful in a number of ways, including both for fronthaul for small cells and backhaul from 4G and 5G baseband units back to the core network and/or for transport between switching and distribution centers in the core network. Common locations of Verizon Enterprise Solutions and XO can enable Verizon to cross connect fiber facilities for backhaul and transport – for example, we could cross connect at [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] and avoid having to create a new hub facility. The XO fiber facilities should help us launch the trial faster and more extensively than otherwise.

24. [BEGIN HIGHLY CONFIDENTIAL INFORMATION]

[END HIGHLY CONFIDENTIAL INFORMATION] As you can see in Appendix 3, XO has deployed fiber throughout the city of [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] which would allow us to

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deploy small cells to advance 4G (and eventually 5G) wireless services throughout the city. Appendix 3 also includes a map showing XO's large fiber deployment in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] relative to Verizon's; adding the XO fiber to the Verizon inventory will allow Verizon to deploy small cells much more quickly than without it. Because of the extensive XO fiber presence in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] we are planning to turn a facility owned by Verizon Enterprise Solutions in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] into a regional hub to support and expand cell site densification efforts in the city. As part of our planning, we conducted preliminary modeling on potential use of XO fiber in [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] in connection with a possible 4G wireless densification based on a typical wireless network design. That design would divide the city into [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] and deploy over [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] that would be connected through backhaul, fronthaul, and transport over [BEGIN HIGHLY CONFIDENTIAL INFORMATION] [END HIGHLY CONFIDENTIAL INFORMATION] miles of XO fiber. While we would need to augment some of the XO fiber with additional facilities, XO's extensive presence means we would be able to expedite deployment of the small cell network in the city. In fact, we could

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deploy small cells throughout the city by building or leasing only **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** of the fiber facilities that we otherwise would have. Based on previous experience, if Verizon were to build fiber to replicate the XO assets in **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** it could take **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]**

**[END HIGHLY CONFIDENTIAL INFORMATION]** to complete. Once deployed, we could use the extensive small cell network for 5G as we start to roll out 5G services on a commercial basis. So the XO fiber assets would facilitate a much faster small cell deployment in **[BEGIN HIGHLY CONFIDENTIAL INFORMATION]** **[END HIGHLY CONFIDENTIAL INFORMATION]** than would otherwise occur.

25. For these reasons, the acquisition of the XO fiber will facilitate Verizon's expansion and densification of its wireless network, improving and enhancing the consumer mobile broadband experience.



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